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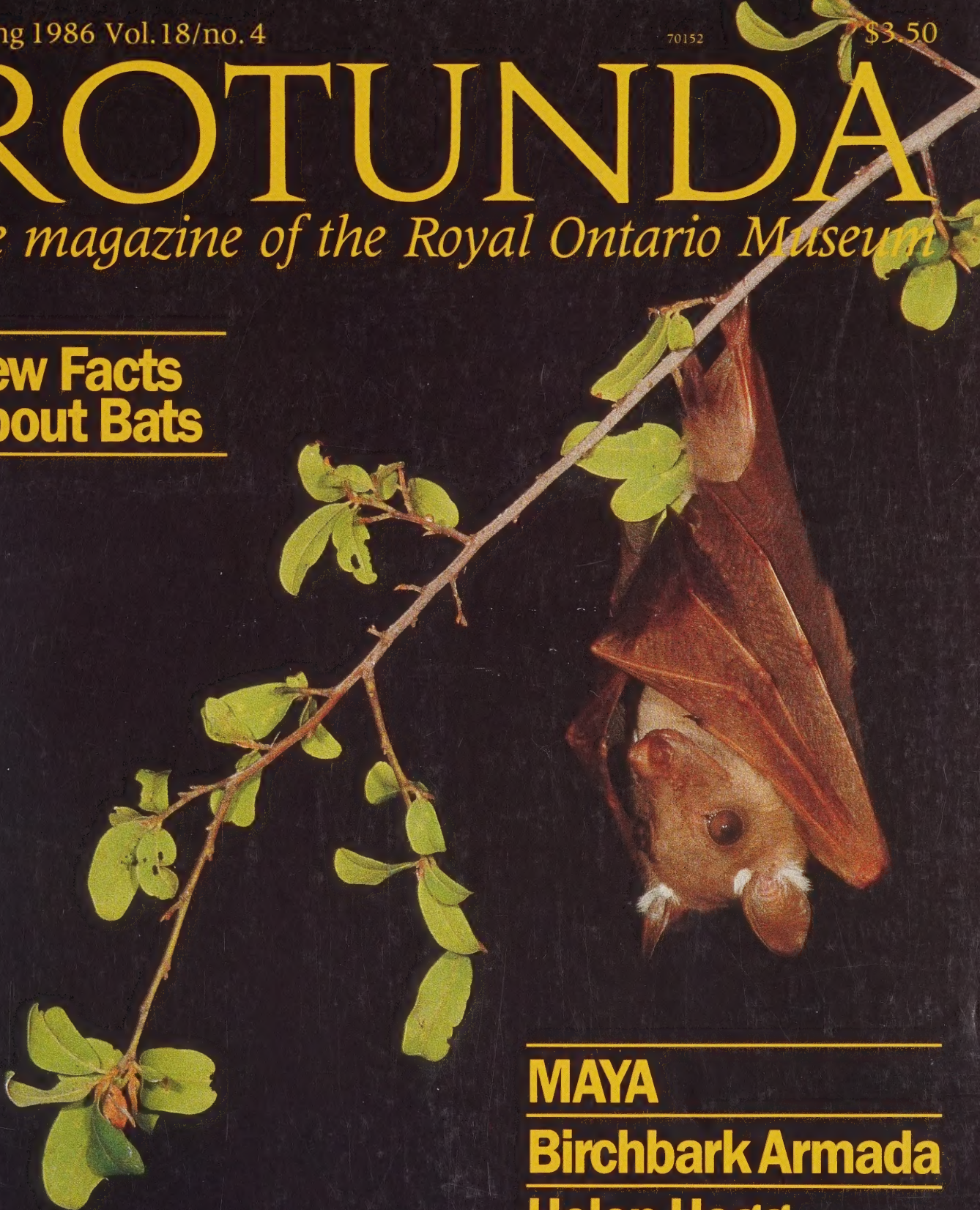
ROTUNDA

the magazine of the Royal Ontario Museum



New Facts About Bats

MAYA

Birchbark Armada

Helen Hogg

Star Crazy

CHRISTOPHER PRATT

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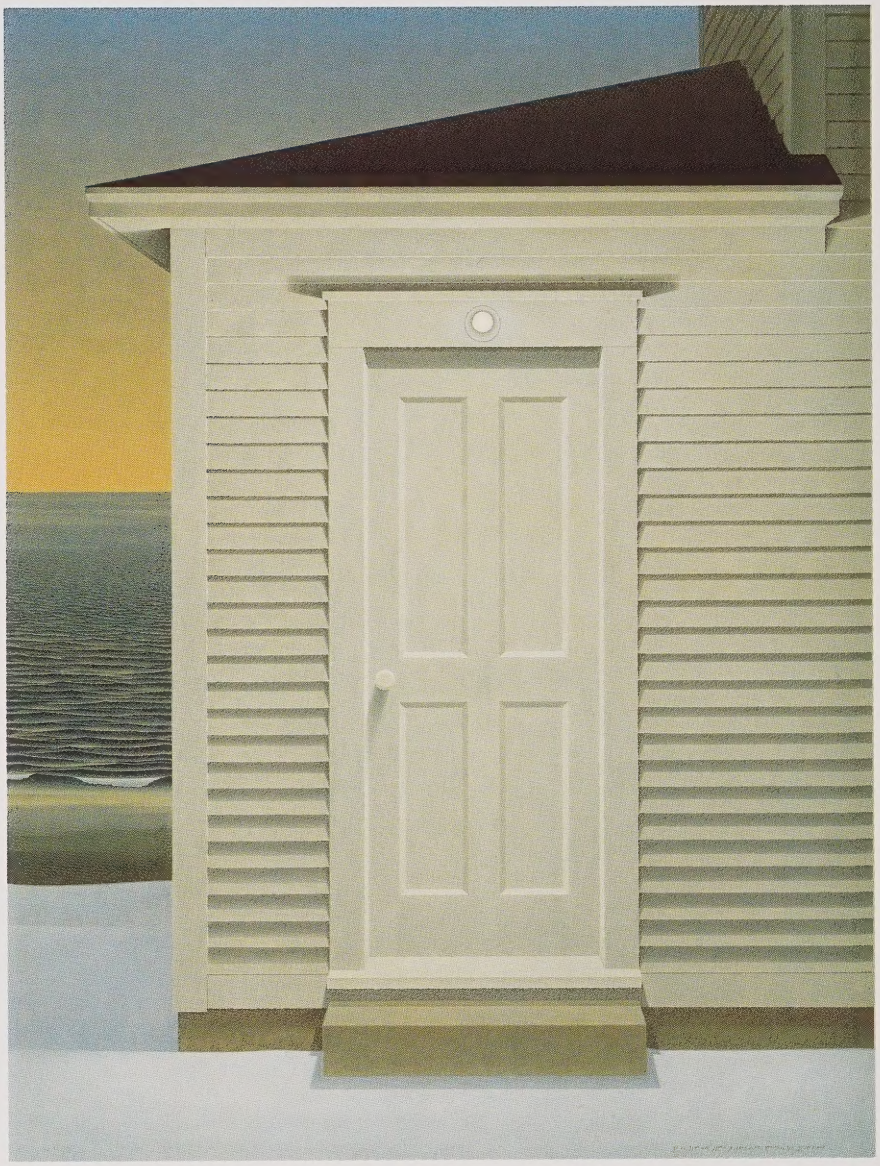

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Getting To Know You

Was Maya culture really very mysterious and remote from our own? David Pendergast answers this question with an emphatic *no*. Pendergast, an archaeologist with a strong humanistic bias, criticizes standard archaeological reporting for making it sometimes seem that "human beings form no part of the study; pots and stone tools appear to have occupied the sites, met and married, produced offspring, and sent their children off to colonize new areas." As an art historian, I was particularly touched by this statement for it is a healthy reminder that often we base our entire perceptions of ancient cultures on a sampling of artifacts and our reactions to them.

In our lead story, Pendergast turns our attention from the splendid remains of the Maya elite to offer some insights into the daily life of the Maya body politic. However slim the findings, we can start to sense the common bonds of successes and failures, joys and sorrows, that form the links of humankind.

A paucity of facts may also give us false impressions of living creatures, even those that are quite common. Consider bats. The reputation of these animals is so poor that the negative meaning of the term "batty" is immediately grasped. In his article about bats, Brock Fenton tells us about the many fascinating discoveries about these animals that biologists have made through the use of new technology. These scientists are learning that the social behaviour of the bird-like creatures often closely follows the patterns of other mammals, including man. We do have more in common with bats than previously thought and much of it is very positive.

In a very different vein of thought, Walter Kenyon gives a compelling account of an episode in our fur-trading history. Fur trading in Canada, it seems, inspires individuals to commit deeds which notably affect the course of international trade. Three hundred years ago, in territory that was eventually to become Canadian, Pierre de Troyes led one hundred men in an overland expedition to James Bay. His mission was to drive out the Hudson's Bay Company, thereby regaining the fur trade for New France. Travelling through the uncharted territory from Montreal to James Bay was considered so bold (or foolhardy) that the residents of the Hudson's Bay Company posts did not even consider this approach when manning their defences. This oversight would bring about their defeat.

Our final main story is about an exceptional person. Helen Hogg, Canada's best known astronomer, has not let her eighty years slow her down. Judith Knelman certainly illustrates this in her account of Hogg's career. Since the writing of this article, Helen Hogg remarried. Dr F. E. L. Priestley, her husband, is also a Fellow of the Royal Society of Canada, also an octogenarian, and a distinguished scholar of English literature. There is surely something to be said for stargazing. We hope that you enjoy this issue of *Rotunda*. S.S.

ROTUNDA

the magazine of the Royal Ontario Museum

Volume 18, Number 4, Spring 1986

Cover: An epauletted fruit bat (*Epomophorus wahlbergi*) was found roosting in some foliage in Kruger National Park. To find out more about him and others like him, turn to the story on page 25. Photo by M. Brock Fenton.

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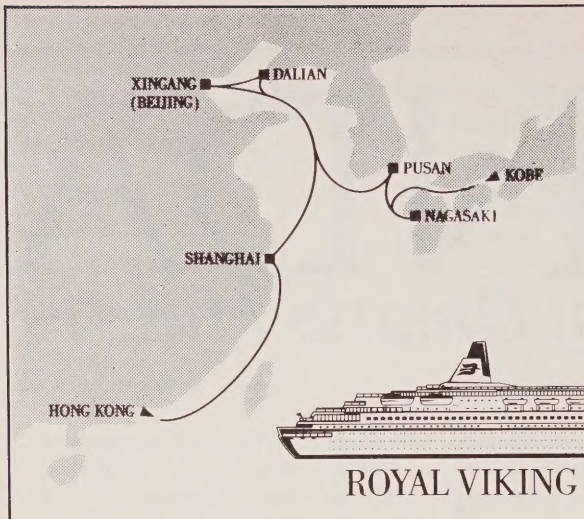

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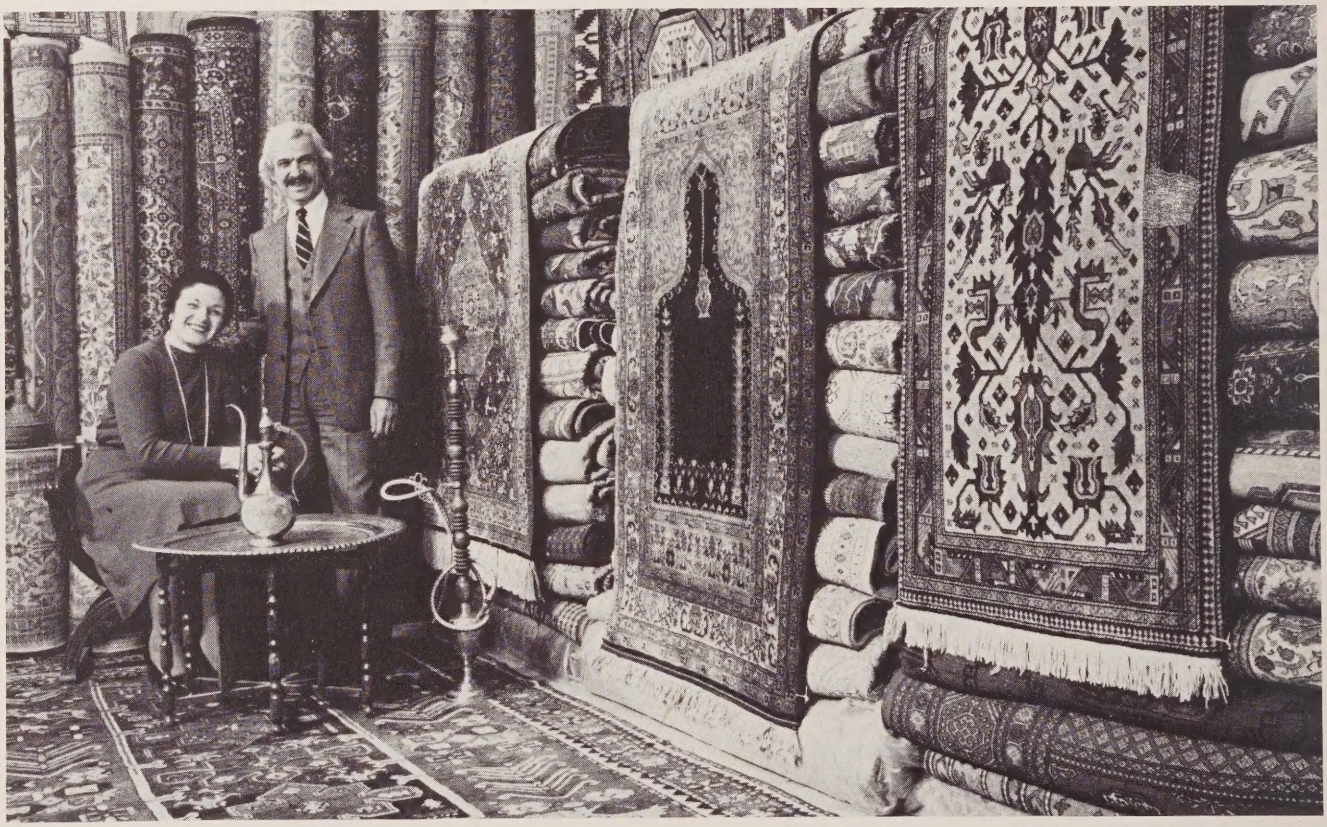

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The Bounty of Olives

GLORIA VARLEY

Olives and their oils can be culinary delights.

There is something about the sight of an olive grove, silvery leaves flickering in sunlight, that suggests an immortality the human heart can understand. Last winter a devastating freeze struck the Tuscan hills of Italy where olives and vines make patchwork with thick-set forests of pine and oak. Many trees, especially in the central region, were feared dead. And yet the olive is one of nature's survivors. Customarily the trees thrive for a hundred years or more—some are said to have lived for one thousand—and when cut back, a flourish of new shoots grow to replace the parent. Throughout the Chianti countryside, skeletal branches will gradually give way to saplings. In seven years the young trees will begin to bear. In fifteen, they will once more hang heavy with fruit. Small wonder the ancients revered this tree, the reliable bearer of so much bounty.

In fact, for so small a fruit, the olive has played a disproportionately large role in human affairs. Combined with spices, olive oil was used to anoint the tabernacle in Biblical times. Ancient Egyptians employed it to help preserve their dead. The oil has burned in lamps all around the Mediterranean basin and contributed its laxative and emollient qualities to medical therapy. Jewellers still use some of the finest oils to polish diamonds. A crown of olive leaves formed the highest prize for victors in the original Olympic games. Cured olives in innumerable array enliven the tables of many lands. Olive wood has fuelled hearths for thousands of years, and is widely used to craft cooking utensils. All this before the olive's vital contribution to the martini is even considered.

The olive is a drupe, a fruit characterized by an outer skin and an inner fleshy layer surrounding its single stone (a classification it shares with peaches and apricots). In its natural state the olive is an unlikely candidate for human food. So bitter is its meat, whether green or ripe, that it's hard to imagine what accident must have befallen some of the berries many millennia ago to first render them edible. One source speculates that they may have dropped from a cliff onto a beach and been washed by the sea's own brine, then discovered by an adventurous eater who happened to be passing by.

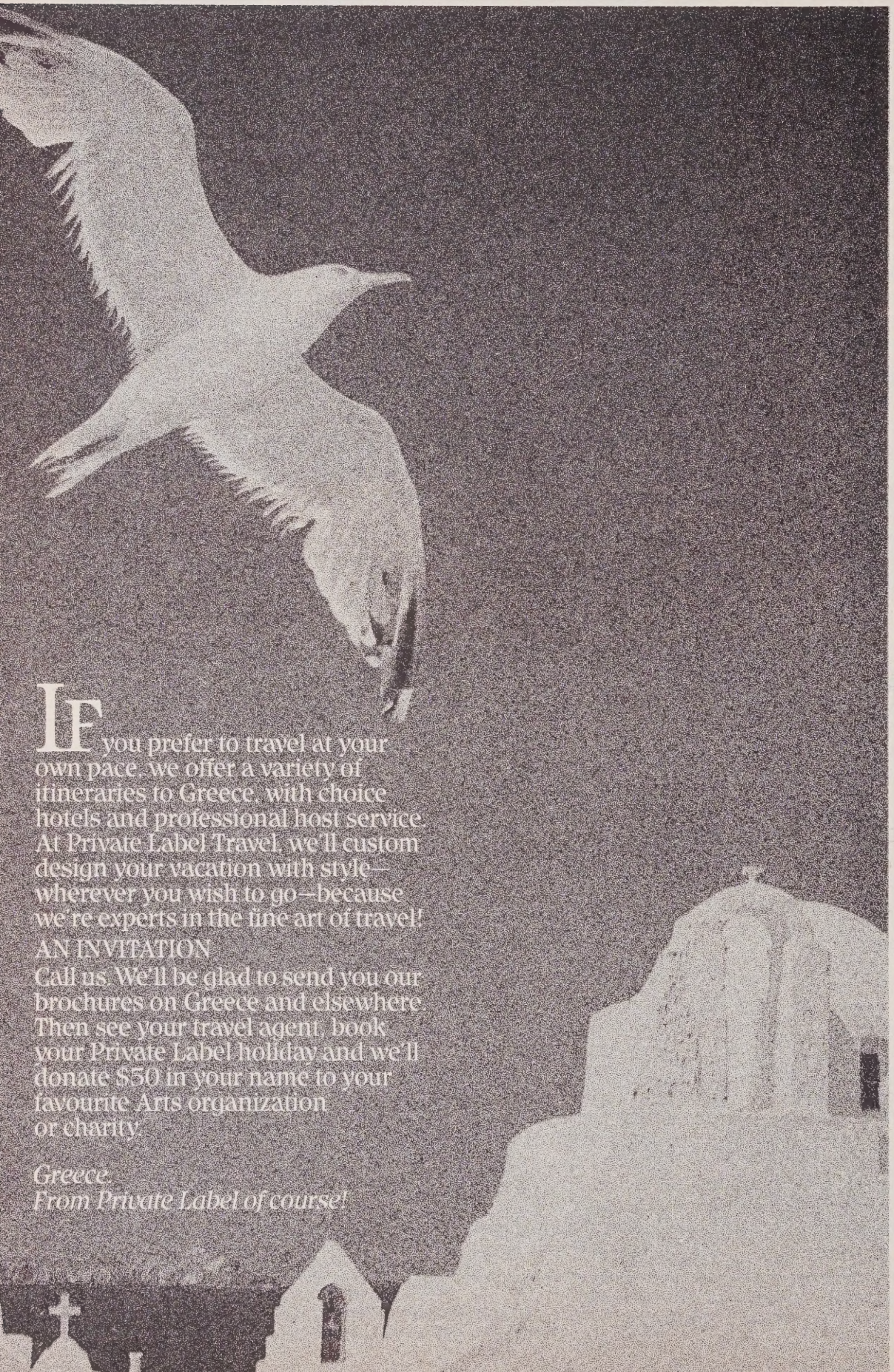
Over time, more efficient measures have been found for ridding the olive of the glucosides that make it so acrid. Pastes of wood ash, salt water soaks, oil cures, and lye baths have all been used, and still are, by farmers putting down the family supply and large producers concerned with world markets. After that, the olive is ready for individualized treatment. Some are sun-dried to shrivelled pungency. Others are marinated, perhaps with lemon slices and oregano or a mixture of orange peel and fennel.

When suitably treated, the olive can be eaten either underripe or mature. But here colours can be misleading. Green may signal either under- or just-ripened fruit. Some red, brown, purplish, or black olives are indeed ripe; others, like the canned Californian product, get their colour from an oxygenation process followed by a fix of ferrous gluconate. Generally, underripe olives whatever their hue are firm-textured, and ripe ones are softer.

Long considered either an exotic or a medicine, the olive's oil is at last coming into its own in culinary North America. Potential customers, however, can be left in a welter of confusion. What on earth is extra virgin olive oil? Is green oil better than gold? If there's a "vintage" year on the bottle, can it be cellared like wine? Is it hopelessly déclassé to use plain old pure olive oil from a two-litre can for frying the fish? What's the difference among oils from Italy, Spain, France, Portugal, Greece . . . ?

At its most basic level, fine olive oil is produced by crushing a combination of red-ripe and underripe olives between massive stones, cold-pressing the resulting paste to extract the liquid, then letting this settle out so that the oil separates from the water and sediment. This is the procedure for true extra virgin oils, which must by definition have less than one per cent acidity. The process has been modernized in many instances to allow the final separation to be accomplished in a centrifuge rather than a settling tank.

GREECE '86



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But with any unfamiliar oil carrying the extra virgin label, it's best to be wary. The *essential* characteristic in countries which regulate production is the acid level, and that can be achieved by means other than a first cold press. Heat can enhance oil extraction. Various chemical processes can be employed to rid lesser oils of their acids and so bring them to "extra virgin" level. Less than scrupulous firms can, quite legally, add some first-pressed oil to their low acid, neutralized product and so capture the extra virgin designation. However, these oils do not have the flavour and character that make extra virgin oil worth its premium price. The best defence is to buy from a source that deals in farm-produced oils, or from a supplier who lets you sample before investing the twenty to fifty dollars a bottle that a sought-after extra virgin oil can command.

The other questions are less complicated than the extra virgin issue. Good olive oil can range from lively gold through smoky green but should never have a coppery tinge. Oil, unlike wine, does not improve with age. General issue olive oils, variously termed "fine virgin", "pure", or simply "virgin", with acidity levels ranging from 1.01 to 4 percent, can be perfectly good products as long as consumers neither expect nor pay for the particular qualities of an extra virgin oil. When it comes to country of origin, France, Italy, and Spain at present have the most stringent labelling laws. This doesn't mean that oils from other regions aren't good, only that buyers must exercise prudence.

Though Greek myth credits Athena with the creation of the olive, its precise place of origin may never be known. That it evolved somewhere in the eastern Mediterranean, its history intimately entwined with humankind's, is all we can tell. Perhaps the Romans best acknowledged our debt in their ancient recipe for health and happiness, "wine within and oil without". It was olive oil, the eternal unguent, they were lauding.

GLORIA VARLEY

Was Beethoven Left-Handed?

Mozart lying feverishly on his deathbed, dictating his final great work, the *Requiem*, to Salieri—a wonderful, if perhaps fictitious, scene in the movie *Amadeus*: a dramatic end to a dramatic life. By contrast, Ludwig van Beethoven's last days in 1827 were an anticlimax: no last-minute works of genius, only a slow fading away at the age of fifty-seven, the great composer finally defeated by an endless series of medical problems. Beethoven's protracted ill health might not make great cinema, but it has created a medical mystery that deepens with each passing decade.

Ludwig van Beethoven had more than forty different medical problems through his life. He had recurrent colds, bronchitis, assorted infections and abscesses as well as pains in his eyes and nosebleeds, vomiting, jaundice, and swollen feet. As a young man of twenty-five, he wrote the final movement of the B Flat Piano Concerto the day before the concert while suffering from severe diarrhea, a malady that would return again and again for the rest of his life. The most famous medical problem of them all was of course his deafness, a loss that was painful physically, as well as psychologically: "Sometimes I can scarcely hear a person who speaks softly; I can hear sounds, it is true, but cannot make out the words. But if anyone shouts, I can't bear it." Eventually he could hear nothing. In 1824 at the premiere of his Ninth Symphony, which includes the celebrated "Ode to Joy", he had to be turned around towards the audience to see that they were applauding madly; he couldn't hear them at all. Even Beethoven's behaviour has attracted medical attention: he was aggressive, often severely depressed, obsessed with cleanliness, and sometimes violent.

Beethoven suffered most of his life, and death was no different. He died in March 1827, after a four-month illness apparently triggered

ANKER ODUM

by a two-day midwinter ride in an open cart. In his last weeks his abdomen swelled tremendously from accumulated fluid, his liver became grossly inflamed, and he had severe jaundice. He died of liver failure, and not surprisingly, the autopsy revealed widespread tissue and organ damage.

Can any sense be made of this incredible series of ills? George Grove, author of the acclaimed *Encyclopaedia of Music and Musicians*, apparently was the first to suggest, in the 1870s' version of his book, that Beethoven had had syphilis. Syphilis, if unchecked, can indeed produce a myriad of symptoms: it used to be called "the great mimic". In the pre-antibiotic era, syphilis could produce deafness, jaundice, anaemia, a swollen liver, and even mental instability and depression. Oddly enough, it was not the parallel between these symptoms and Beethoven's that suggested syphilis as Beethoven's killer. Instead it was the reported existence of two prescriptions in Beethoven's name for medications containing mercury. Mercury was the treatment of choice for syphilis before World War I, but in Beethoven's day, mercury was prescribed for all kinds of medical problems. Considering his collection of illnesses, Beethoven would surely have received mercury at some point. There's really no good evidence that Beethoven had syphilis.

In the 1970s and '80s, medical opinion has swung towards something completely different: a disruption of the body's immune defence system called autoimmune disease. Autoimmune disease was unknown in Beethoven's time, and isn't very well understood now, but it occurs when the immune system, which normally protects us against foreign invaders like bacteria and viruses, instead attacks the body's own tissues and gradually destroys them. It's not known why this happens. Normally when foreign or novel things appear (this can even include a transplanted organ), a chain of events is set in motion, culminating with a full-fledged attack on that "non-self" tissue by mobile cells of the immune system and the antibodies produced by some of them. When this is mistakenly aimed at the body's own tissues, it can be devastating. Rheumatoid arthritis is an autoimmune attack directed at the connective tissue of the joints. In juvenile diabetes, the targets are the insulin-producing islet cells of the pancreas.

As for Beethoven, Dr Edward Larkin, writing in 1970, suggested Beethoven had had an autoimmune disease whereby his immune system attacked connective tissue in various places in his body. Then in 1981, a group at the Dr Everett Chalmers Hospital in Fredericton reviewed the case once more and decided that Beethoven had two strikes against him: a depressed immune system *and* the autoimmune disease ulcerative colitis. Colitis, a disease of the bowel, would explain the recurrent diarrhea, and it can lead to liver damage. It's even conceivable that Beethoven's myriad ills were caused by two or more autoimmune diseases acting together, a not infrequent occurrence.

Even since these recent diagnoses, there have been a couple of twists to the story. In 1982, studies in the United States of people with otosclerosis, a gradual immobilization of the third bone of the middle ear, the "stirrup", showed that in many cases the patient's immune systems were making antibodies that attacked the inner ear tissue. Is this what deafened Beethoven? Even more fascinating is the sugges-

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tion by the late Norman Geschwind of Harvard University that autoimmune disease can be associated with left-handedness.

This may seem strange, but in the early 1980s Geschwind studied left-handers and their families to see if any medical problems are associated with left-handedness (there was already some evidence that learning disabilities were more common among left-handers). Geschwind found an association with learning disorders, as expected, but he also found an association with autoimmune disease. Why should these two conditions have anything to do with left-handedness? The link might result from what Geschwind suspected was a kind of overdose of the male hormone testosterone during fetal life. He theorized that this hormone somehow pushes the immune system to attack itself and also slows the development of the left hemisphere of the brain. When this happens, the right hemisphere of the brain dominates, the child becomes left-handed, and at the same time the child runs a greater risk of having learning disabilities or, according to other research, of being more creative in mathematics and music. There is now one question that cries out for an answer: was Ludwig van Beethoven left-handed?

There's unfortunately no hard evidence that I'm aware of, although late last year Dr Karl Smith, an emeritus professor of psychology at the University of Wisconsin, claimed to have discovered that most musicians are left-faced, that is to say, the left sides of their faces are more active and mobile than the right sides. Besides videotaping living opera singers, Smith also studied portraits of dead musicians and found that most of them were left-faced too, including Beethoven. And Smith thinks left-faced people are more likely to be left-handed. But Smith's is only one preliminary study. If anyone reading this knows of other, more solid evidence that Beethoven was left-handed, I'd like to hear it. Beethoven's music endures—why shouldn't his medical history too?

JAY INGRAM

"All That's Bright Must Fade . . ."

Thomas Moore 1852

The exhibition of a small collection of dolls, essential to the *World of Childhood* case in the new Canadiana gallery at the ROM, posed a dilemma for conservators. The dolls contain light-sensitive fabrics which would be damaged by continual exposure to light. The Canadiana gallery is permanent, so all the objects will be displayed for a long period of time. Curators and conservators had to find a way to enable the public to see these charming and unique toys while protecting them from the consequences of prolonged exposure to light.

Light is the most dangerous threat to the well-being of textiles. It can cause their fibres to dry out and to become brittle and frail. As light is a form of energy, it can even break fibres apart. It is also the most common cause of the fading of dyes. Therefore, the Museum tries to follow the international convention that after six months of display, textile objects are returned to dark storage for several years.

The light-sensitive objects destined for display were two handmade cloth dolls and three commercially manufactured dolls. The latter have body parts made of ceramic and bisque which are insensitive to light, but the clothing is not immune. A cradle with six pieces of bedding was also included.

The solution to the dilemma came from the Canadiana Department curators. The original dolls and bedding were placed in storage and ROM conservators produced accurate reproductions for display. Only the clothing from the third bisque doll and the quilt from the bed were not copied. The fragile silk costume of the doll is sewn directly onto her body and its removal would have required removing the original stitching, thereby causing too much damage. This doll will be removed from the display after six months. The original quilt was actu-

PHOTOGRAPHY DEPT., ROM

Three of the original dolls.

Reproductions of the three original dolls, produced by ROM conservators.

ally part of a quilt face (with no padding or backing) made of many large squares and small triangles of multi-coloured printed fabrics. To find the exact materials today would be extremely difficult. Because the quilt was much larger than necessary to cover the cradle, it was simply divided into three parts by opening two seams. One of these three pieces will be displayed every six months.

The reproduction of the two cloth dolls proved to be the biggest undertaking. The first, a black rag doll, made about 1870–80, probably came from a small black community in the Annapolis Valley of Nova Scotia. She is crudely constructed but utterly charming. Her body, arms, and legs are made of black twill but the head is made from a tabby-weave material, possibly because of a shortage of twill. The doll's face, simple but expressive, is embroidered. A piece of imitation Persian lamb was used for her hair, an ingenious alternative to the otherwise painstaking task of applying each strand of hair individually. She is wearing an oversized cream-coloured wool dress with crocheted edging on the neck and armholes. Ornamental cross-stitching on each foot suggests boot or shoelaces.

The second doll, made in Ontario about 1920, is a little more sophisticated in construction and equally charming. Various sock wools were knitted as one piece in stocking stitch to form the doll's shape and clothing. The doll is wearing long black boots, grey breeches with a black belt, and a red jacket. The features on his beige head and hands have been embroidered. The hair, hat, and buttons were applied separately. Once again, an inventive method was used to make curly hair. The hair is simply a knitted strip, sewn in place, with the sides cut and some side stitches unravelled. Before being applied to the doll, the piece of knitting was left uncut for at least two days so that once unravelled, it remained curly. This doll has a special history. It was chosen by Canada Post to illustrate a stamp issued for Christmas 1979, the same year that it was donated to the Museum by Mr Arnaud Maggs.

Finding suitable materials for the reproductions was the prime concern. Some materials were found in the Museum's textile conservation laboratory, other materials, such as pieces of lace, old buttons, and scraps of fabric, were found at home. Edith Starink, a lace specialist and research associate from the Textile Department, offered advice and was able to provide most of the lace needed. Antique markets, fabric and dressmakers' supply shops, and department stores were other excellent sources.

Some of the fabrics for the black rag doll are no longer produced, but were fortunately found in our own supplies. However, old imitation Persian lamb for the hair could not be found, and the modern imitation, which looked too new, was also very expensive. Finally an old and inexpensive piece of authentic Persian lamb, which had been used for a collar, was discovered and put to use.

The materials for the knitted doll were relatively easy to find except for the grey wool of his hair, hat, and breeches. Because it was not possible to find wool of the right colour, a light grey wool was carefully dyed to attain a darker but not uniform colour. The result was a shade paler than the original, but motley in tone, and so in keeping with the original.

Finding materials for the clothing of the commercially manufactured dolls provided some interesting challenges. Often substitutions had to be made which are not accurate but give the correct appearance.

The lace trim around the hem of the Emily doll's petticoat is unusual because this type of coarse machine-made lace is normally produced on a larger scale for pillowcases and other articles. The lace found for the reproduction is not an

exact match but it is a machine-made lace of about the same quality. For Emily's stockings, an elastic material was needed that would conform to the shape of the leg. Pantyhose are especially designed for this purpose, and two layers of avocado green pantyhose material proved to be very satisfactory for colour match, elasticity, and opacity It was impossible to find mercerized crochet thread that was also graded in colour to reproduce Emily's yellow, crocheted boots. The solution was to tie dye some old thread of the same type in order to create the graded effect.

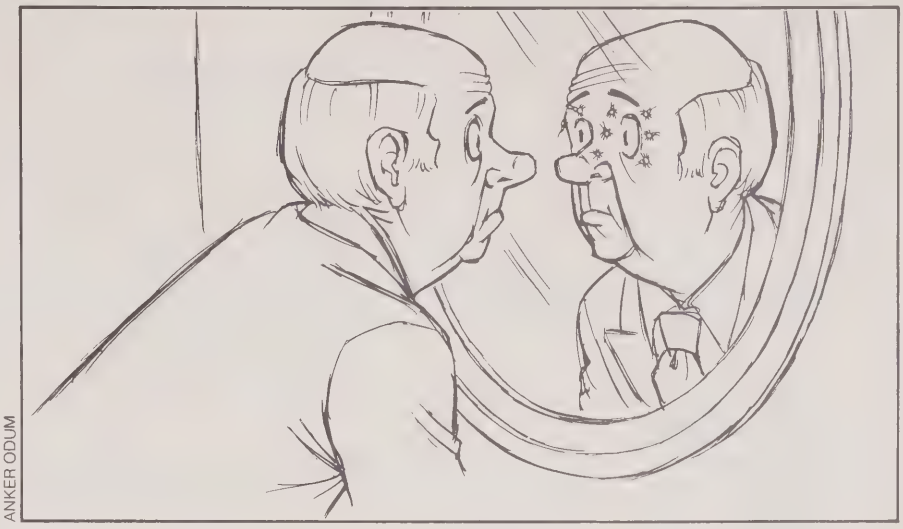
The next task was the reproduction of the cradle bedding. No blue-and-white striped ticking similar to the original pillow and mattress fabric could be found. Vivien Jenkins, who is studying textile conservation, wove the required amount of material. There are fewer warps and wefts in the reproductions than in the originals but the appearance is almost the same.

The techniques employed to make the reproductions are as varied as those employed to make the originals. However, there were some surprises. Not all of the toys had been made by trained craftsmen: in some instances, they were probably made by the children who owned them. Consequently, the assembly of the dolls and their garments was often unconventional. In order to produce accurate copies, each step of the original assembly had to be carefully considered. For example, when recreating Emily's dress, the sleeves were set in, as usual, from the inside, but the finished result did not look like the original. When the sleeves were set in from the outside of the dress instead, they immediately took the proper shape.

To avoid any confusion over the identity of the originals and the reproductions, the reproductions have been clearly labelled. After several years of exhibition, there will be an opportunity to study how the fabrics in the reproductions have altered.

IZABELLA KRASUSKI and CARA REEVES

Rotunda Quiz Facing the Facts



ANKER ODUM

1. Recognizing faces is something we do very well: decades can pass and you'll still recognize the faces of your high school friends without much trouble. What part or parts of the face are most important for recognition? And, what is prosopagnosia?

2. If you want to read someone's emotions, to which side of the face should you pay most attention?

3. The Neanderthals lived in Europe and the Middle East until 35 000 years ago, and for most of this century they've been portrayed as stooping, brutish sub-humans—the model for Alley Oop. Now, however, the Neanderthal image has changed so much that two anatomists have written: "If he could be reincarnated and placed in a New York subway—provided he were bathed, shaved, and dressed in modern clothing—it is doubtful that he would attract any more attention than some of its denizens." Ignoring for the moment what that says about the New York subway, if you did come face-to-face with a Neanderthal, what would be his most striking facial feature?

4. As you gaze deeply into your own eyes in the mirror, do you get the uneasy feeling that you're looking at other living things besides yourself? You should. What are they?

5. In 17th- and 18th-century Europe, and even before, women put drops of the drug belladonna in their eyes. Why did they do this?

JAY INGRAM

The answers are given below.

1. Research so far has been unable to identify any one facial feature, or even a set of them that is crucial to recognition. It's not the shape of the nose, or the distance between the eyes, or anything like that. It seems that we take the entire face in at a glance, and recognize it. It's a fantastic feat when you consider that we see faces at different angles, in different lights, with different expressions from when we last saw them, and sometimes not until years later.

Prosopagnosia is the inability to recognize faces, even one's own face—faces seem out of focus, or look like cubist paintings. This condition results from damage to specific areas of the brain, apparently in both left and right hemispheres. The right hemisphere, the "pattern-recognizing" hemisphere, has always been credited with facial recognition, but prosopagnosia suggests that, at least when it comes to familiar faces, both sides of the brain are involved.

2. The left side. Although there's still some controversy about this idea, it seems that the movements of the mouth, eyebrows and cheeks that express emotion are more intense on the left side of the face; this means that the right hemisphere of the brain, which controls that side, is more involved in emotional expression than the left hemisphere. An interesting sidelight: in more than ninety per cent of smiles, one corner of the mouth travels faster and farther at first, then the other corner catches up and often passes the first.

3. If you said heavy brow ridges and sloping forehead, you're close. They, together with a small chin, are all characteristic of Neanderthal faces. But the most striking feature is that the whole skull is swept forward: as if someone had taken the nose, and pulled it out, bringing the whole front of the face with it. This large prominent nose and swept back cheeks are what you'd probably remember most from a "face-to-face" meeting with a Neanderthal.

4. Your forehead alone is home for two hundred thousand bacteria per square centimeter: one million three hundred thousand per square inch! The numbers are higher around your nose and mouth, too. But most of us are used to the idea of bacteria. The real shocker is the follicle mite: *Demodex folliculorum*. These sausage-shaped creatures, less than half a millimetre long, live, feed, and breed snuggled down at the base of your eyelashes. They never move very far, and there are usually never more than one or two per eyelash . . . but we all have them.

5. Belladonna, or atropine, causes the pupils of the eyes to dilate. Women thought this made them more attractive, (bella donna means beautiful woman) and there's psychological research to substantiate this idea. Our pupils dilate when we're looking at something interesting; it could be food, or jewelry, or another person. The psychologist Eckhard Hess has shown that this plays a role in judgements of attractiveness: men looking at pictures of women find the women with dilated pupils more attractive. Outside the lab, it probably works like this: if you are looking into someone's eyes, and that person's pupils are dilated, it means that they're looking at something interesting, ie. you. So they become attractive to you. It all works at an unconscious level, but it does seem to work. Of course this is something that everyone in the eighteenth century knew.

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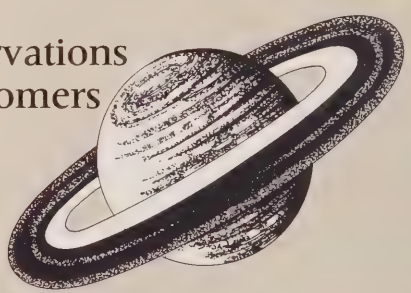

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ROM Life Sciences Contribution 141, James D. Eckert and Carlton E. Brett, 16 pp., ill. $2.75

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The Ancient Maya
LIFE IN THE SLOW LANE

It sometimes seems that human beings form no part of standard archaeological reporting; pots and stone tools appear to have occupied the sites, met, married, and produced offspring. How do we learn about the people behind the objects?

David M. Pendergast

MAYA. In almost everyone's mind, the name conjures up images of temples gleaming amidst tropical verdure, jade-bedecked rulers resplendent in jaguar skins and feather head-dresses, and enigmatic carved monuments watching over scenes of ceremonial grandeur. Such images are real enough; they are given concrete existence in every aspect of Maya art from painted vessels to pottery figurines, woodcarvings, and the jades themselves. Yet one who marvels at such objects should be conscious that the art treasures give us just a glimpse of the uppermost stratum of the society, a relatively small administrative body that rested on a foundation made up of the middle and lower classes.

It is difficult enough to resurrect society's foundations in our own history; we know far more about the workings of medieval European governments than we do about the lives of the governed. Only rarely does an individual emerge from the mass, usually as a result of some action that brought him or her into contact with government. When the documentation of the past is wholly archaeological the gulf between the anonymous peasant and ourselves grows even greater, simply because the less one has in life, the less one leaves for the excavator to discover and to analyse. Modern research in the Maya area strives to extricate the lives of the common people from the debris of the centuries, but the focus of popular interest quite expectably remains the spectacular achievements of the ancient society's elite and their artist-craftsmen servitors. Visitors to an exhibition of Maya art will be awed by the power and the grandeur of objects representing great wealth, but all too often they will lack any awareness of the commoners who lie hidden behind each piece.

Opposite page: The meaning of the name of the merchant deity, Ek Chuah, is not entirely understood. This 17.1 cm, brightly painted head from Mayapán, Yucatán, is one of a number that seem to some to be humorous, largely because of the oversize ears and nose. It is hard to be certain that what we see as comic was indeed funny to the ancient Maya; all we know for sure is that the merchants to whom Ek Chuah was the patron god have receded so far into the past that we cannot begin to give them the individuality that this figure seems to have.

PHOTOGRAPHS COURTESY DEPT. OF NEW WORLD ARCHAEOLOGY, ROM

Though it stands in isolation now, this 22-metre-high Altun Ha temple was the scene of intensive activity between about A.D. 550 and 850. At times the building was given over entirely to ceremonial processions, offerings, and other public events; otherwise it was often scrambled over by hordes of stone-carriers, masons, plasterers, painters, and others, under the supervision of an architect who was probably a member of the ruling class. Between major construction efforts the tropical climate dictated nearly constant effort by plasterers and painters.

Opposite page: This 20-cm-high jade chest ornament is from the tomb of an Altun Ha ruler who died quite young. The carving of a seated figure above two faces was obviously executed by a talented jadeworker; if the same person also drilled the hole that runs from top to bottom and comes within a hairsbreadth of the surface at one point, he must have had sweaty palms and a nervous stomach long before the task was completed.

If we are to appreciate Maya culture to the fullest, we should see in the temple both priest and peasant, both acolyte and plastermaker. In every polychrome vase we should perceive not only the icon but the painter, the potter, and the digger for clay; each jade should lead us from the ruler whose splendid personage it adorned to the master carver. The carver received the material from a porter who brought it from a distant quarry under arrangements made by a merchant. The merchant dealt with a quarrymaster for whom peasants laboured to extract the precious stone. Ultimately one should be able to detect in the most elaborate artifacts the traces, however minimal, of everyone whose labours made the splendour possible, including the corn farmer, upon whose back rested the great weight of the New World's longest-lived and grandest civilization.

It takes only imagination, plus some knowledge of how ancient Maya society worked, to reconstruct a great many small facets of everyday Maya life from works of art. How do we fare, though, when we turn from the exhibition to the excavation and seek to reconstruct the daily round, or at least the broad sweep of events, from the ruined houses and refuse heaps left by the Maya body politic? Sadly, the answer is all too often, "Not very well." Lives in which nothing of great social moment occurred cannot reach out to touch us after all these centuries; we can almost never really know what motivated the rebuilding of a modest home, or the placement of a particular pottery vessel in the grave of a departed child. However, by combining domestic data with information on the grand aspects of society, and by applying knowledge of how human beings generally act, we can at least come to know something about how people fared in general, and how their lives were shaped by the actions of their rulers.

The evidence of domestic life is often tantalizing despite its thinness. At the household level more often than in a great work of art one may find a potter's fingerprint preserved on a crude clay figurine, or encounter the image of a deity modelled over the most convenient core, a small ear of corn. Here are miniature vessels in the graves of children, probably specially made to accompany a lost son or daughter in the afterlife; here, too, refuse heaps around mouldering buildings may contain every non-perishable object and all the food bones discarded by a family as a home was nearing abandonment. Although the people themselves remain beyond our grasp, their household goods and food remains often provide a fully rounded picture of the growth and decline of a family's fortunes. The picture is generally more complete than the one we can paint for the society's rulers, and is as clear a reflection of the civilization's rise and fall as we can perceive in the great temples and tombs.

Just as we cannot wrest the lives of individuals from the domestic refuse, so also do we lack one of the insights into personality that exists in a good many other archaeological contexts: the identification of artists, or at least schools, on the basis of pottery and other kinds of artifacts. Though individual objects may stand out because of their beauty of form or the delicacy of their carving or painting, there are no signatures, either in writing or in elements of style, to distinguish the Maya artists' work. Identity was almost wholly submerged beneath the needs served by art, and it is quite likely that in this respect Maya art is a true mirror of the society. Nowhere, it seems, was there an artist or craftsman who dared place his equivalent of "Gislebertus hoc fecit" on the back of a stonecarving or in some inconspicuous spot in a painted vessel scene, and perhaps nowhere in ancient Maya life was this sort of individuality encouraged. Yet anyone who sets out to mount an exhibition of Maya art, or sorts through fragments from excavation, recognizes the superlatives in every category; surely such recognition existed in ancient times as well, but it was not given the form we would expect today, and we therefore know the artists only through the talent displayed in their works.

Though we are unable to give a name to any artist, the wielders of the brush and the carving knife fare better in the archaeological record than many middle-class people, for at least the products of their talents can be identified. Flint-knappers, stonegrinders, masons, and workers in bone and shell disappear in the near-uniformity of their products, while weavers, joiners, tanners, featherworkers, papermakers, and all the others who laboured with perishable materials have left little if anything as a memorial to their abilities. For some of these artisans we at least have representations in vessel paintings or carved monuments of the skills they brought to their work, though the objects themselves have long since succumbed to tropical humidity. For others, though, submersion within the body politic is complete, because the results of their labours were entirely intangible.

Of the invisible elements of Maya society, perhaps none was more important than the merchants. Here were the entrepreneurs, the people whose energy made commerce among cities work, and placed raw jade in the hands of a carver hundreds of kilometres from the nearest quarry. Surely the merchants were people of power in every major community, and probably even in the hamlets. Though trade was undoubtedly regulated by the rulers, the knowledge and skills wielded by the merchants were what made the system run, and no society fails to give due recognition to that fact. Yet nowhere in the Maya area can we securely identify the home of a merchant, let alone give a name to such a person; no-

Above: When it was tossed into a dump beside a ninth-century Altun Ha house, this object may have been unusable because its handle was broken. Similar things are still in use in the Maya area, and so we know that the curious platter is a *comal*, used in the cooking of tortillas. Hence we have evidence that the Maya turned part of their corn crop into thin, tasty multipurpose wafers, though not even a trace of a tortilla has survived.

Above right: Ancient Maya clothing has all but disappeared; only in the rarest of circumstances do we have fragments of the cloth that was once combined with other materials in royal raiment of the sort depicted on this monument from Tikal. The ruler, in loincloth and massive headdress, stands facing columns of glyphs at the left that give his name and those of others in his lineage, as well as dates in his reign. Nowhere is the name of the monument's carver recorded, and the equally nameless weavers and featherworkers have nothing but the carver's product as a testimony to their great talents.

Below right: This is the six-room bungalow of a middle-class Altuñ Ha family, abandoned in the 8th century A.D. when a much grander residence was built behind it. Throughout the rooms lie the changes that any family will make in a home occupied over many years, but apart from masonry benches that were added to provide housing for burials, we can only guess at the reasons behind the modifications. Luckily, the occupants of the new house used this one as a garbage dump, in which they left us an excellent assortment of 8th- and 9th-century household goods.

The little bat on this 6.9-cm-high jar seems an almost whimsical portrait, but the importance of the creature in Maya religion probably gave the jar some ceremonial meaning. Still, the potter may have intentionally given the bat's face a quizzical look, if the pot was the plaything of the child in whose grave it was found at Altun Ha.

where do we have evidence of the perquisites that a merchant enjoyed in his community, and nowhere can we trace a merchant's steps along the paths that led from producer to consumer. We are forced, instead, to speak (often on the slimmest base of evidence) about patterns of trade and possible trade routes, while the traders themselves have vanished in the archaeological record.

If we cannot extricate the individual from the data, what sense of human endeavour, of human experience, can we derive from excavation? If one looks at standard archaeological reporting, it sometimes seems that human beings form no part of the study; pots and stone tools appear to have occupied the sites, met and married, produced offspring, and sent their children off to colonize new areas. The data force a bit of this approach at times, but often there are elements in the archaeological record that show us the people as clearly as we shall ever be able to see them. A single artifact may, as we have seen, have this quality about it, but so may a whole range of what seem to be the driest sort of excavation data. At Lamanai, for example, months of digging and drawing have given us both knowledge of the form of a great temple and a picture of community redevelopment in which the occupants of small thatched houses were swept aside in order that a huge monument to the gods could be erected on their homesite. In the Maya case it was demanding deities rather than ruthless developers who dictated the uprooting, but still we can surely know something of the feelings that pervaded the small houses, because so many in our own society have experienced the same upheaval. We may not be able to feel truly close to those ancient homeowners, but at least we can sense parallels between their lives and ours.

Whether we are examining the finest art objects or sorting through the meanest artifacts and the smallest bits of a ruined house, we cannot emerge fully satisfied; too much of what gave Maya life its character has succumbed to the onslaughts of time and tropical climate, and the people themselves, save for a few of the rulers, have gone down into the dust of anonymity. A journey through a display of the superlative achievements of ancient Maya artists will nonetheless always be a rewarding experience, but if the journey encompasses glimpses beyond the beauty to the people, the viewer can come away enriched by the knowledge that in some ways ancient Maya life is neither as mysterious nor as remote as it seems to be at first glance.

David Pendergast joined the ROM in 1964 and is curator in the Department of New World Archaeology. Since joining the ROM he has directed excavations in Belize, first at Altun Ha (1964–1970) and then at Lamanai, where the Museum will continue to work through 1986. He is now beginning the thirteenth season at Lamanai, having completed the third of five volumes of the Altun Ha final report. The first volume of Excavations at Altun Ha, Belize, 1964–1970 *was published by the ROM in 1979 and the second volume in 1982.*

"Maya–Treasures of an Ancient Civilization" will be on view at the ROM from 22 March to 15 June 1986. The exhibition has been organized by the Albuquerque Museum and made possible by generous grants from the Albuquerque Museum Foundation, the City of Albuquerque, and the New Mexico Economic Development and Tourism Department. Additional support has been received from the Brown Foundation, Inc. and the Barrow Foundation of Houston, Texas, and the National Endowment for the Arts, a U.S. federal agency. International air transportation was provided by Cargo Development Group (CDG), a subsidiary of Continental Airlines, Inc.

PHOTOGRAPHS BY M.B. FENTON

WHAT'S NEW IN BATS?

M. Brock Fenton

Although their nocturnal habits may be old hat to the bats, modern technology is revealing information about these fascinating animals that is new and exciting to us.

SEVERAL features of bats have captured people's imaginations. Flight makes them seem rather like birds, but they are clearly mammals, giving birth to live young to which they feed milk. The "sonar sight", or echolocation, of bats intrigues man and the blood-feeding habits of vampire bats surely attract attention. But while we know a great deal about some aspects of the biology of these mammals, their nocturnal habits have made them difficult to study, and the gaps in our knowledge are large enough to keep several more generations of researchers quite busy. Recently biologists have made some interesting discoveries about bats, underscoring their diversity and the different adaptations which they have evolved.

The altruistic behaviour of vampire bats has been the subject of studies by American zoologist Gerald Wilkinson, who studied a population of them in Costa Rica. To the biologist studying social behaviour, a sociobiologist, the incidence of altruism is interesting, since it seems unlikely that it would have evolved through natural selection. One could argue that a gene for altruism would not prosper in a population unless animals with the gene had some way to protect themselves from cheaters—individuals accepting the altruistic acts of others but not reciprocating. In some ways, vampire

bats are ideal subjects for work on altruistic behaviour. Like other bats, they live a long time. They form socially stable groups comprising relatively few individuals, and in captivity they have been observed regurgitating blood to individuals who had not fed.

Wilkinson has endured long, uncomfortable periods in the field observing the common vampires *(Desmodus rotundus)*, many of which he had marked with distinct coloured bands; in some cases, he had also attached radio transmitters. He determined that, after weaning, the young were often unsuccessful in their attempts to feed on any given night. Specifically, Wilkinson demonstrated that vampires less than two years old stood a ten per cent chance of failing to feed on any two successive nights; the comparable figure for adult bats was 0.5 percent. Failure to feed presumably reflected the difficulty of finding a vulnerable prey. Since vampires cannot survive three days without food, regurgitation of blood by successful foragers could make a significant difference in the survival of young adults. By holding some vampires in captivity over night, Wilkinson demonstrated that only unsuccessful foragers were fed by their roost-mates.

The data showed that vampire bats shared food with individuals who were in danger because they had not fed. But what mechanism protected the altruists against cheaters? Sociobiological theory predicts that in a social setting where the group size is relatively small and individuals can recognize one another, familiarity ensures that cheaters do not prosper because they can be recognized and, presumably, ostracized.

Wilkinson's is a landmark study. It represents a classic example of reciprocal altruism and makes us realize that man is not unique among animals in demonstrating this characteristic. The work also underscores the importance of some system that makes altruistic behaviour resistant to cheating, and shows that work on bats is relevant to research on other animals, including man.

The study also raises many interesting questions such as the intriguing problem of how bats communicate. Like other mammals (including man) bats exercise several options when communicating. Bats are well known for their vocalizations, and vampire bats are no exception. The role of visual displays in

Previous page: This epauletted fruit bat *(Epomophorus wahlbergi)* was found roosting in some foliage in Kruger National Park, South Africa.

Below: Gerald Wilkinson studies common vampire bats *(Desmodus rotundus)* like the one pictured here.

communication is known for other bats, although it is not known for vampire bats. And like other mammals bats use olfactory signals (scents) to communicate information.

Whenever you watch someone conducting an animated conversation by telephone you will realize that mammals often use several channels of communication simultaneously. It is possible that Wilkinson's vampires rely on several channels of communication for recognition of individuals.

Recently Brian Hickey, a student at Carleton University, while investigating a question of bat communication, examined the morphology of some bat hairs from preserved specimens in the collection of the Department of Mammalogy at the ROM. He found that in some free-tailed (Molossidae) and old world fruit bats (Pteropodidae), specialized hairs protrude from some glands. In other mammals gland hairs are strikingly different from body hairs and appear to be specialized for dispersing scents, the products of the glands from which they protrude. The specialized hairs appear to serve a communication function and are analagous to paint brushes as structures designed to hold and disperse liquids. We still need to perform some behavioural experiments to confirm the function of these hairs, which are known as osmetrichia.

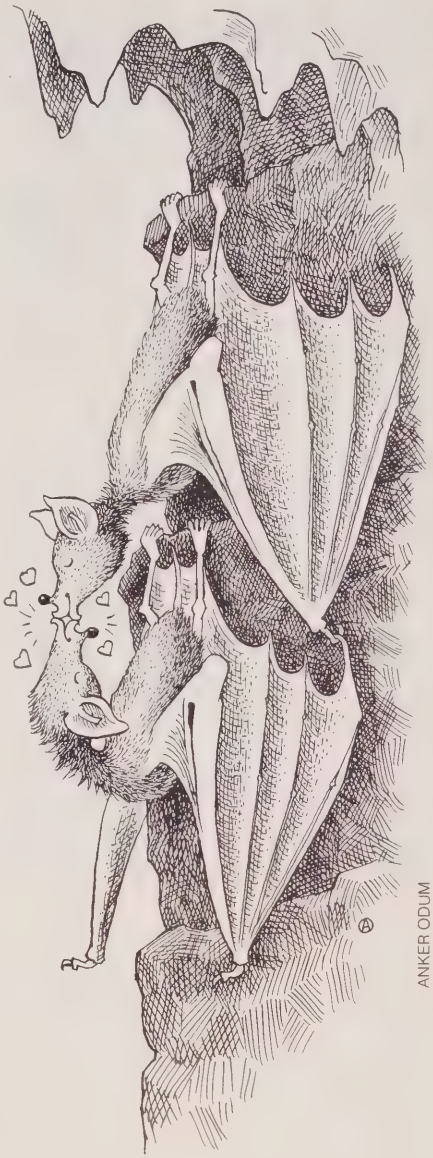
Necks are another interesting part of bat anatomy. The remarkable degree of flexion in the necks of certain bats is the result of the unusual structure of the neck vertebrae. A colleague, Laura Crerar, and I used the ROM's mammal collection as a source of material to investigate the structure of the necks of some bats. Although thoughts of mammalian necks bring to mind giraffes and teenage courtship behaviour, our study suggested that the necks of some bats were more strikingly specialized than the spectacular necks of giraffes.

Bats are divided into two groups, the Megachiroptera and the Microchiroptera. The former group includes the flying foxes and their relatives, the old world fruit bats, and the latter group includes all other bats, from vampires to fishing bats to insectivorous bats. Humans and megachiropteran bats can flex their necks a maximum of ninety degrees to look straight up (actually down for bats which hang by their feet). By comparison, the microchiropteran bats have remarkably flexible necks which they can arch 180 degrees in order to look straight behind.

The neck vertebrae of the microchiropteran bats are specialized to permit this degree of flexion. The arch protecting the spinal cord is very thin and delicate, and the lower central part of each vertebra locks to the one in front and the one behind by means of ball and socket joints. The first known fossil bat, the sixty-million-year-old (Eocene) *Icaronycteris index*, shows this specialization indicating that it is as old as the oldest bats known to science.

The time bats spend in different activities or the areas they regularly traverse could not be documented because the nocturnal habits of bats made it difficult for ecologists to collect detailed information. With the advent of radio transmitters weighing less than a gram, having a range of eight hundred to four thousand metres, and a battery life of ten to twenty days, it is now possible to follow the movements of insectivorous bats. Mark Brigham, a graduate student at Carleton University, has been following big brown bats *(Eptesicus fuscus)* around Manotick, Ontario, and I have been studying lesser yellow house bats *(Scotophilus leucogaster)* in southern Africa.

I was surprised to learn that both of these species spend less than ninety minutes each night away from their roosts; on most nights less than sixty minutes. For these bats, virtually all time away from the roost is spent feeding. Both species fly continuously while hunting for and pursuing flying insects. Their outward flights are slow, following a zigzag path which extends as much as five kilometres away from the roosts; the return flights are rapid and more direct, with few changes in course. Both species consume thirty to fifty per cent of their body weight in insects during the foraging period. Lactating big brown bats tend to make a second foraging foray later in the night, but this usually lasts only thirty minutes. As the season progresses, young big brown bats spend less time foraging, apparently reflecting their increased prowess at catching food.



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Below: A scanning electron micrograph of a specialized gland hair (osmetrichia) taken from a bat

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It is obvious how the western big-eared bat *(Plecotus townsendii)* got its name but its eyes are also very conspicuous.

In Manitoba, Robert Barclay used radio-tracking and found that hoary bats *(Lasiurus cinereus)* often spend over two hours a night in flight away from their roosts. Since these bats also pursue flying prey, most of the in-flight time probably represents hunting. In contrast to big brown and lesser yellow house bats, hoary bats sometimes travel over twenty kilometres from their roosts in one evening. There appear to be two fundamentally different approaches to foraging among these three species, something that could be predicted from the different wing morphologies, but could only be proved when one could follow individuals to see what they actually do while hunting. The hoary bat appears to hunt at long range, sacrificing manoeuvrability for flight speed. The big brown and lesser yellow house bats have broader wings, greater manoeuvrability, and slower flight speed. Further studies with other insectivorous bats have indicated that some species make short flights from perches only when targets come within range. There are also differences in the design of the echolocation calls used by these bats. We have no details about the

hunting strategies of most insectivorous species, but radio-tracking studies promise to reveal some in the near future.

Radio-tracking studies can also shed light on questions about the roosting strategies of bats. It is common to read that predation may have played an important role in shaping the evolution of bats. Bats can roost in narrow cracks and crevices or squeeze through narrow openings and roost in inaccessible hollows. This is possible because they are thin in profile through the chest. The prominent keels on the breastbones of birds are lacking in bats. It is tempting to suggest that a narrow day-roost that offers protection from predators has been important to bats and their ancestors. But it is risky to invoke predation as a force influencing the evolution of bats. It is easy to suggest that a particular pattern of behaviour minimizes the risk of predation, but if you find no evidence of predators, does this confirm or confound your suggestion? The absence of predators could reflect an excellent defensive strategy or a dearth of danger.

Explanations about the roosting habits of bats reflect this conundrum, but radio-tracking studies are helping us to solve the riddle. Mark found that big brown bats roosted in groups and returned to the same roost time and time again. If he sealed the entrances to the roosts and forced the bats to move, they selected an adjacent roost and appeared to remain together as a group. By leaving the roost with other bats, an individual could reduce his chances of being captured by a predator waiting in ambush. It is tempting to hypothesize that the roosting patterns of big brown bats could reduce the chances of individuals being captured *but* there was no evidence of a predator.

An alternative way of thwarting an ambush predator would be to roost in a different place every day so the predator could never be certain where to make his ambush. In this case there would be no advantage to roosting with other bats. Lesser yellow house bats roost alone and use this roosting pattern. Research on other species of bats shows that these two strategies of roost occupation are widespread, but none of the studies has provided direct evidence of predation.

At this stage we have only questions about the factors which influence the choices bats make about roosting sites. Predators may be one factor in the choice; social constraints and the temperature conditions in roosts may be others. We need more information to be able to make sense of a complicated picture, and there is no reason to presume that all bats will show the same patterns or the same reasons for their selection.

The roosts that bats occupy sometimes put them in direct conflict with people. The big brown bats which Mark studies roost almost exclusively in buildings, and in most Canadian cities where people complain about bats roosting in their houses, big browns are the culprits; in more rural settings, both big and little brown bats roost in buildings.

In Canada, house bats constitute a nuisance, albeit an important one if the human residents are strongly chiropterophobic; but they do not constitute a health hazard, although like other mammals they are susceptible to rabies and could, by biting, transfer the rabies virus. Big brown bats often hibernate in buildings, and so they may turn up at any time of the year. Little brown bats never overwinter in buildings.

If you consider your house bats a nuisance, the most effective way of evicting them is to seal up the holes that they use as entrances and exits. Since bats will not chew their way back in, they can be excluded with light-weight building materials; I recommend screening for holes that are important for building ventilation and caulking or moulding for other places. If you live in a heritage house with many access routes for bats, excluding them may be time-consuming, but it is the *only* effective way to control them.

Some people who feel strongly about bat conservation will consider the eviction of bats unacceptable. Since colonies in houses often involve females and their young, efforts to control bats could adversely affect the survival of some species. In Britain it is unlawful to evict or harass bats without the permission of the Nature Conservancy Council. For many homeowners ridding

Top: The funnel-eared bat *(Natalus micropus)* weighs under 3.5 grams. It is an insect eater found in Jamaica.

Bottom: The Jamaican fruit bat *(Artibeus jamaicensis)* is known for the conspicuous leaf on its nose. The large teeth of this bat enable it to grab hold of and eat large pieces of fruit.

These epauletted fruit bats *(Epomophorus wahlbergi)* were found roosting in a shelter cave in Kruger National Park, South Africa. They are normally found roosting in foliage.

themselves of resident bats is a priority, but in Britain this option is available only after appropriate consultation. Is eviction of bats from their preferred roost sites synonymous with a death sentence?

Mark's work in Manotick demonstrated that colonies of big brown bats forced to use alternate roosts produced fewer young than those left undisturbed in their preferred roosts. Evicted bats tended to move to the closest available roost, usually within one hundred metres of the old one, and in many buildings used as roosts, the human occupants were unaware of their resident bats. The radio-tracking allowed us to demonstrate that eviction of big brown bats was not equivalent to a death sentence, although the disturbance did adversely affect reproductive output. Eviction can be a humane method of controlling house bats and one not totally at odds with their conservation.

The lesser yellow house bats that we studied in Africa and the hoary bats that Robert Barclay worked with in Manitoba roost in trees; the former in hollows in the trunks, the latter in the foliage. The big brown bats which Mark studied for over five hundred bat nights (one bat with an active transmitter for one night equals a bat night) roosted in buildings more than ninety-five percent of the time and only occasionally in hollow trees. The bats seemed to prefer buildings as roosts. Only further work will clarify the relative importance of natural versus artificial roosts in the lives of big brown bats over a broader area than the environs of Manotick.

Radio-tracking is a powerful technique which has contributed greatly to our knowledge of many kinds of animals from bats to birds, from mice to elephants. An animal with an active radio tag can be easy to locate and just the location may be surprising. For example, in Kruger National Park in South Africa we found eight epauletted fruit bats *(Epomophorus wahlbergi)* roosting in a shelter cave by following the signal from a radio-tagged female. This species was presumed to roost only in foliage and therefore the use of the shelter cave indicated the flexibility of roost selection.

Deciding what is new in the bat world is often difficult. For example it was almost three hundred years ago that the Italian scientist Lazarro Spallanzani

concluded that bats could see with their ears. He based the conclusion on experiments which denied his bats the use of their senses of sight, touch, and smell. Only when he interfered with their hearing did they lose their ability to detect and avoid obstacles. In the 1930s, the American zoologist Donald R. Griffin clarified how bats could see with their ears. He used microphones sensitive to high frequency (ultrasonic) sound to monitor the behaviour of his bats as he duplicated many of the experiments described by Spallanzani. Griffin demonstrated that bats used *echoes* of sounds that they produced to *locate* objects in their path, and he called this mode of orientation echolocation.

Today we take the idea of echolocation (bat sonar) for granted and realize that other animals have this ability. Recent experiments have shown, however, that in many instances some hunting bats cease to use echolocation and switch to less conspicuous modes of orientation such as vision, or listening to sounds coming from prey. People interested in electronic warfare will appreciate the penalties associated with giving away too much information about oneself, and bats seem well equipped with a variety of alternate strategies. Just recently some workers in Germany demonstrated that the margins of the noseleafs of vampire bats bear heat-sensitive detectors, providing these animals with a convenient way of locating areas on their prey where the skin is not protected by fur or feathers.

There is always something new about bats in the world of science as we explore further the biology of these fascinating animals. Scanning electron microscopes, radio transmitters, or microphones sensitive to high-frequency sound represent technologies that have allowed us to probe some of the unexplored areas of bat biology. In the hands of scientists instruments such as these can reveal new and exciting information about bats, but what is new for us is old hat to the bats.

M. Brock Fenton is a professor of biology at Carleton University, Ottawa, and a research associate in the Department of Mammalogy, ROM. His research has focused on various aspects of the ecology and behaviour of bats in locations around the world. He is the author of Just Bats *(University of Toronto Press, 1983) and* Communication in the Chiroptera *(Indiana University Press, 1985).*

A Visit to The Museum and Archive of Games

David Young

PHOTOGRAPHS COURTESY MUSEUM AND ARCHIVE OF GAMES

Inukat, the Inuit game of bone gambling

Top centre: A view of part of the exhibition *Wired on Pinball: An Electrifying History*, showing machines from the 1950s, the "golden age of pinball"

MULTI-COLOURED lights flashed in perfect synchrony with the marcato thudding of solenoid-activated chimes, and mounting numbers flickered to show my final score as the fifth and final ball rolled slowly and safely past the flippers, dropping into the inner recesses of the machine. I was totally oblivious to the world around me while playing the Bally Wizard; my only purpose was to try to beat the machine.

The Bally Wizard was one of the nine playable pinball machines from the exhibition *Wired on Pinball: An Electrifying History*, organized by and displayed from May to September 1985 in the remarkable Museum and Archive of Games at the University of Waterloo. According to Dr Elliot Avedon, director/curator, this museum is the only institution in the world dedicated solely to the collection of games; a surprising fact, given the numerous studies on games conducted by sociologists, anthropologists, historians, psychologists, those in the field of recreation, and even mathematicians and computer scientists. Experts in all of these areas make use of the collections of the Museum and Archive of Games.

A game is usually defined as a contest in which all players initially have the same chance of winning; the essence of any game is competition. Game-playing, therefore, covers a very broad range of human activity, and because the games people play can tell us a great deal about many aspects of their lives, it is not surprising that games are studied by experts from so many fields.

Avedon is a sociologist and co-author of the book *The Study of Games*, published in 1971. Like others in his field, he views games as "structured systems of behaviour" separate from the "real world". Though the form of a game may have changed with technological innovations, in most cases its rules and the way it is played change very little over time. The popular game of chess, originally an East Indian war game, may now be played by computer, but players still follow the rules developed over eight hundred years ago.

Touring Ontario's Museums

From time to time *Rotunda* publishes articles about the activities and histories of other museums in Ontario. The Museum and Archive of Games is the fifth feature of the series, "Touring Ontario's Museums".

Finding the Museum and Archive of Games is easy. The B.C. Matthews Building, situated by one of the main entrances to the University of Waterloo campus, houses the museum in its core, at the street level. A three-storey atrium with hanging plants and potted trees borders the exhibition space. There is a spacious parking lot near the building and a municipal bus stops at the door. Operated by the university and a citizens' advisory board, the museum is open from 9:00 a.m. to 5:00 p.m., Monday through Friday, and 1:00 to 5:00 p.m. on Sundays.

A colourful game of tiddly-winks

It is not as easy as one may imagine to collect objects used in games, for they are not often preserved. Favourite games tend to be kept until the objects with which they are played are either worn out or broken. These objects rarely have a significant monetary value; they don't evoke the sentimental attachment of dolls and other toys; and they are not usually valued for their appearance.

The collections of the Museum and Archive of Games have grown from the material that was originally collected by Dr Avedon while researching and writing his book. The museum was founded in 1972, a year after the book's publication, when Avedon began displaying his collection in an anteroom of his office at the University of Waterloo. By the late 1970s, he had arranged to have the collection moved to larger display facilities on campus. The collection now comprises over 1500 games and an equal number of documents, and it has been housed since 1981 in the B.C. Matthews Building of the university. Most artifacts in the collections belong to indoor games; there are also some that belong to outdoor games. The museum prefers to collect games of historical and cultural importance to Ontario and to Canada, particularly native games. Currently the museum is exhibiting traditional and modern Inuit games.

The history and evolution of many different kinds of games may be traced through the collections. In the ancient Egyptian game of *senet*, played more than 3500 years ago, two players would throw casting sticks to advance over a course of thirty squares that simulated not only a race but also the journey to heaven, watched over by the falcon god Horus. The Romans adopted the game and renamed it *tabula*. In the Middle Ages, *tabula* developed into the game of tables from which backgammon was derived. The familiar games of snakes-and-ladders and parchisi, both of ancient Hindu origin, are also based on the *senet* model.

Classic war games such as checkers and chess and the oriental game of *go* also

Above: An exterior view of the Museum and Archive of Games

Right: Students in the third year University of Waterloo course "Introduction to Museum Management", which is taught by museum staff, work with a gallery model during an exhibit planning project.

form part of the collections, as do traditional games such as the European game of mill and the very popular, very old African game *wari*. There is also a variety of modern cardboard games such as Monopoly and Trivial Pursuit as well as a number of computer games on floppy diskettes, and hand-held electronic games. Gaming materials such as dice, marbles, roulette wheels, and devices used for score-keeping can also be found in the collections. The archive houses documents, photographs, and books relating to games and game-playing.

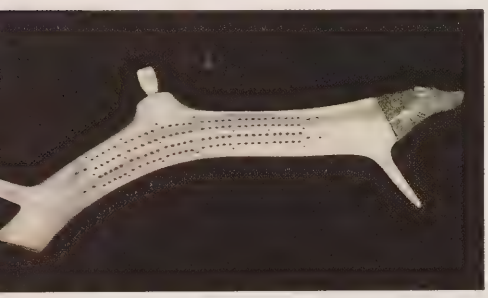
Daily research on the collections is conducted by the staff. Dr Avedon is a professor in the Department of Recreation at the university. The author of over one hundred articles, monographs, and books, he is also an elected member of the Institute for Computer Research and a member of the Academy of Leisure Sciences, and has long been active with UNESCO's International Federation of Data Organizations. His right hand is Mary Tivy, assistant curator. A graduate of the Master of Museum Studies program at the University of Toronto, her interest in games developed through her studies in anthropology, several years in the ROM's Department of Ethnology, and current studies in material culture.

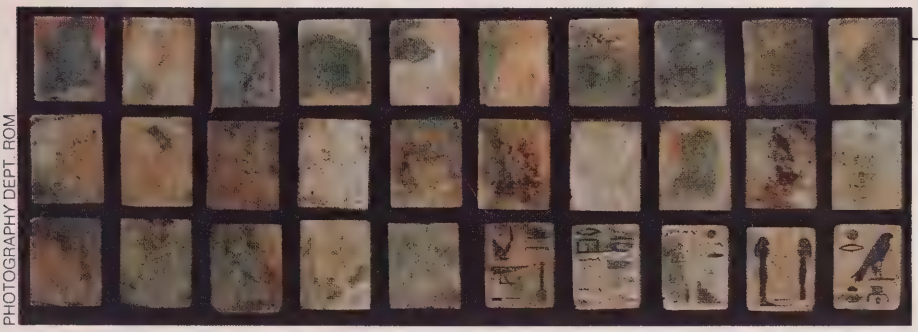
The themes of the exhibitions organized by Avedon, Tivy, and their staff are varied. A hands-on section is included in most exhibitions, and visitors are encouraged to play with reproductions of the games on display.

One of the most popular recent exhibitions, "*Hot Stuff: Trivia and Fantasy Games*", featured Trivial Pursuit, Dungeons and Dragons, and a variety of other board games both old and new. Even Trivial Pursuit has its antecedents. The Road to Wealth: How to Know London comprises a map of London, dating from about 1840, on which players can advance their markers along a designated route by correctly identifying landmarks. What Do You Know About Canada? was placed on the market by the T. Eaton Company in 1923. One of the most popular games of the 1950s was Go to the Head of the Class. Players would start the game with their markers placed on "nursery school" and advance the markers to "Grade VIII" and the "head of the class" by successfully answering general knowledge questions.

According to Mary Tivy, one of the reasons for the phenomenal success of Trivial Pursuit is that the game was introduced just as the interest in Rubik's Cube was waning and the time was ripe for something new. Because the questions in Trivial Pursuit are based on general knowledge, it is a game that the whole family can play and everyone meets with some success almost immedi-

A cribbage board in the shape of an animal, following the natural shape of the bone





PHOTOGRAPHY DEPT., ROM

Squares from the ancient Egyptian game of senet. The squares are faience inlaid with lapis lazuli.

ately. Since the advent of Trivial Pursuit, there has been a general resurgence in the popularity of the older board games such as Monopoly, Scrabble, and Risk. Most people who tried computer chess and bridge have now gone back to the conventional game formats, and the popularity of electronic and video games has subsided greatly.

Why the change? Avedon suggests a number of possible reasons. As the public is now familiar with computer games, they are no longer a novelty. The difference in cost between board and electronic games may also affect their popularity. Board games cost between fifteen and thirty dollars while electronic games may cost up to several hundred dollars by the time that the machine and the game cassettes are purchased. One of the major advantages of board games is that they provide opportunities for people to interact with one another instead of with a computer or television screen.

Computers and computing are, however, an important part of the dynamics of the Museum and Archive of Games. The University of Waterloo is world-renowned for research and development in the computer field, and the museum, as part of the university, has always been encouraged to experiment with computers.

Because of the museum's computer experience, it was asked by the Ontario Museum Association to host a seminar, in spring 1982, on the use of computers in museums. People from more than thirty museums attended, and many of them wanted to learn how to computerize their museum operations. As a result of the seminar, a group of ten museums, including the Museum and Archive of Games, decided to attempt an experiment hosted by the University of Waterloo. Each of the museums agreed to allocate a full-time person, necessary space, and a specific amount of funds to the project, and thus the Waterloo-Wellington

The Railway Puzzle, an early board game

The open pinball machine, Aztec, gave visitors to the Museum and Archive of Games an opportunity to take a rare glimpse into the inner mechanism.

Museum Computer Network was inaugurated. It is now possible for members of this network to exchange information electronically with members of other networks in Canada, the U.S., and Europe, thereby giving them instant access to thousands of experts in many fields.

The Waterloo-Wellington Museum Computer Network, developed primarily through the efforts of Dr Avedon, has attracted international interest in the museum community. This is another impressive first for an outstanding museum; an achievement that should be acknowledged with flashing lights and ringing chimes.

I must admit that the score that I achieved on the Bally Wizard last September was modest, even though it was announced with all of the fanfare characteristic of the best pinball machines of the 1970s. The theme of the pinball exhibition was the evolution of the game beginning with bagatelle in the 1800s. The exhibition included a bagatelle table, dating from the 1850s, that may be the only one of its kind in Canada. Bagatelle was played using ivory balls and cue sticks. The main goal was to propel the balls into holes assigned with various points, and the player that accumulated the most points was the winner.

In a later variation of this game, players would drop marbles or push them with a short cue, one at a time, so that they would roll across a board, where they were deflected by a series of pins into numbered pockets. (Hence the origin of the name pinball.) When I was a lad we used to make this kind of game with a plain board into which we would drive a vast quantity of finishing nails.

(Usually the nails were arranged so that the owner of the board would win more marbles than he would lose.)

A spring-loaded ball-plunger was introduced to bagatelle boards early in the 20th century. The boards were manufactured to withstand commercial use when penny-and-nickel coin mechanisms were incorporated into the traditional design in 1931. These games were usually sold to store owners who would place the games prominently on their counters. Even through the Depression years people somehow found the required coins to feed into the games. The tilt mechanism was a ball in a cup, and the owners undoubtedly found it difficult getting the ball back into place after over-eager players had tilted the game.

The coin-operated bagatelle board was enlarged, placed on fine ashwood legs, and became known officially as pinball in the mid 1930s. At this stage in its evolution, the game was largely a game of chance. The player gained more control over the ball when flippers were introduced in 1947. Pop-bumpers were added the next year. These devices vigorously repel the balls that bump them, adding new life to the game. For some reason the standard ashwood legs were universally replaced with metal ones in 1957.

The golden age of pinball machines was during the 1950s. During the next decade, interest in pinball declined. Then in 1969 the rock group The Who produced *Tommy*, the rock opera about a deaf, dumb, and blind boy who could beat everyone at pinball. The stage production and the movie version released in 1975 gave pinball a new lease on life.

One of the machines on display in the exhibition could be opened to offer a rare glimpse of the inner mechanism. The part of the machine which operates the flippers, pop-bumpers, and chimes, is called the solenoid. (The word solenoid is of Greek origin and means "pipe-shaped".) The solenoid is a coil of wire with a movable inner core; when an electrical current flows through the coil, the core is drawn into the coil. This action creates the thudding marcato sound of the chimes; the sound that is partly responsible for drawing players into the blissful oblivion of pinball.

David Young is head of Outreach Services, ROM, a new department combining the former departments of Extension and Advisory Services.

The Birchbark Armada

An overland expedition to drive the Hudson's Bay Company out of James Bay was a daring yet feasible concept in the eyes of the Marquis de Denonville, governor of New France. Led by Pierre de Troyes, one hundred men made the treacherous journey and proved that the governor was right.

Walter A. Kenyon

THEY left Montreal on 30 March 1686, moving in a straggly line up the frozen Ottawa River. An overland expedition to drive the Hudson's Bay Company traders out of James Bay was a daring yet quite feasible concept in the eyes of Jacques de Brisay, Marquis de Denonville, the recently appointed governor of New France. Denonville had been sent to the colonies to subdue the obstreperous Iroquois, and to establish the French presence more firmly throughout the entire region, which to his thinking included James Bay. The English traders occupying this part of the French hinterland were reaping a rich harvest of beaver by dealing directly with the Indians of the bay region. As a result, fewer Indians were bringing pelts down to the St Lawrence to trade with the French. Denonville found this situation quite insufferable for it reflected upon his authority as well as upon his revenues. His solution was to drive the English out of James Bay; hence the thin line of men and equipment moving up the Ottawa River.

The expedition consisted of one hundred men, led by Pierre de Troyes, a major in the French colonial regulars. Thirty of the men were soldiers; the other seventy men were wiry, French-Canadian voyageurs who had served their apprenticeship in the brigades of the fur-traders. Expert canoeists, they were thoroughly at home among the rapids and portages of the Canadian north. De Troyes's men were an unruly lot, by all reports, but were magnificently suited to the task at hand. It was some three hundred leagues or seven hundred and fifty English miles from Montreal, on the St Lawrence River, to Moose Factory at the southern end of James Bay; at least half of the territory was known to the French only through vague reports.

Their passage was made more difficult because of the amount of gear that they were carrying: thirty-five birchbark canoes for use on the northern rivers after breakup, muskets and grenades for the attacks on the English settlements, a variety of axes and shovels, tents, spare clothing, food, and pots and pans. All of the gear, including the canoes, was hauled on sleds pulled by dog-teams or by oxen. The oxen proved to be unsuitable for such work; they were slow and ponderous, and had a disconcerting tendency to go through the ice. A few such episodes persuaded the men to send the oxen back to Montreal and to pull the sleds themselves.

De Troyes and his party left Montreal while the rivers were still frozen, in order to reach James Bay in the early summer, well before the annual ship could be expected to arrive with supplies and additional forces from England. If his campaign was to be successful, the element of surprise would be crucial, for once alerted, the English would man the ramparts of their wooden forts and easily repel an attacking force that was armed only with muskets, swords, and grenades.

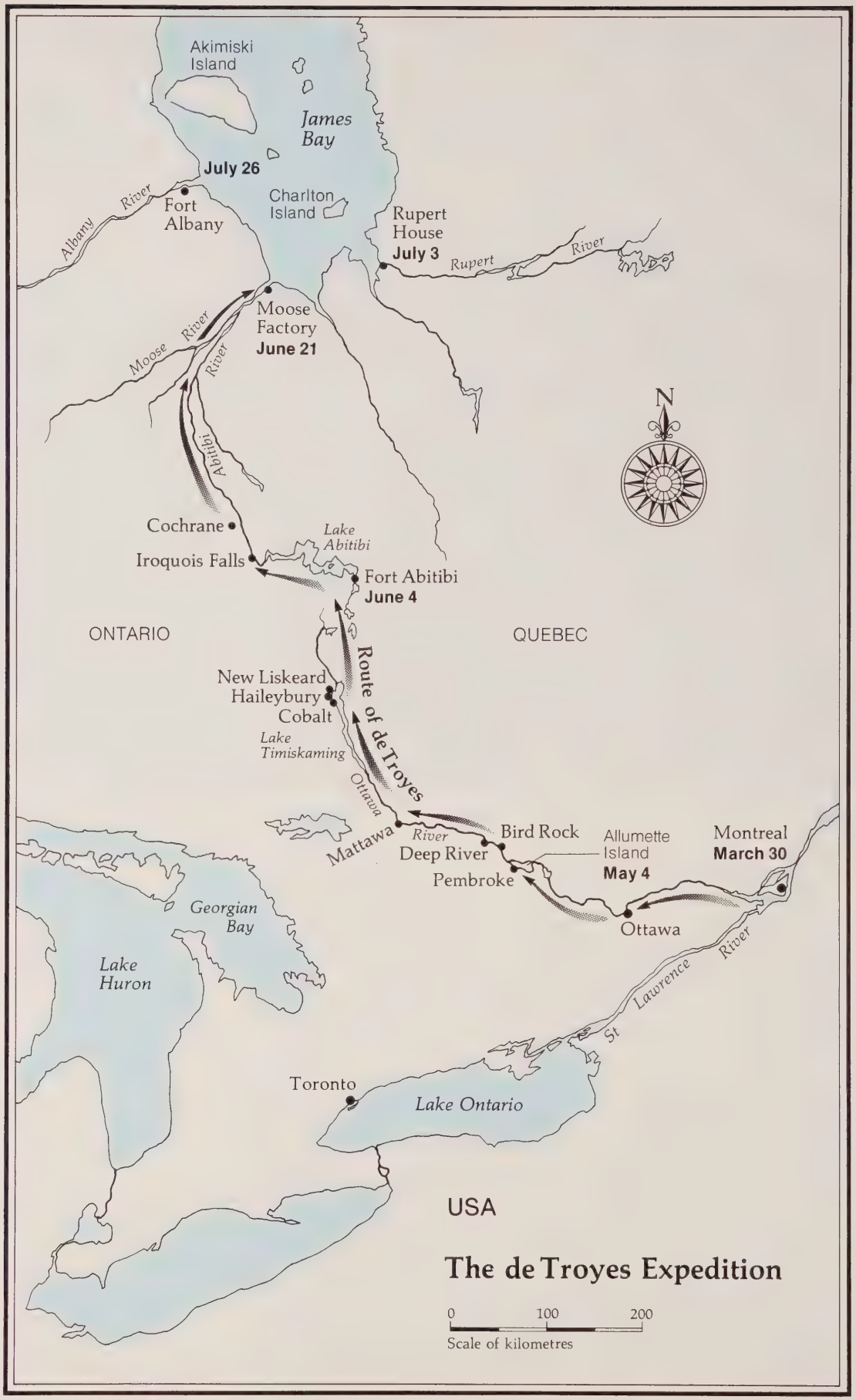
PHOTOGRAPHS BY W.A. KENYON

Bird Rock on the Ottawa River is where de Troyes's men left offerings for the spirits of the river.

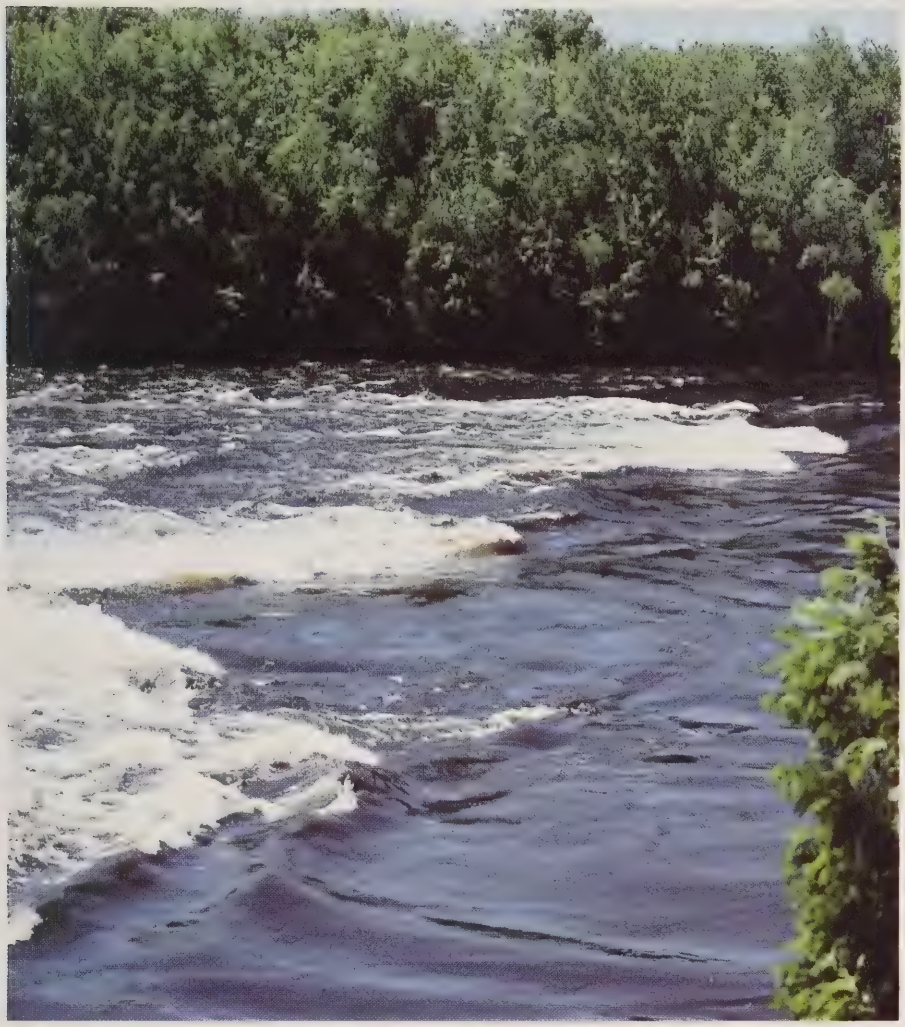
However, the Frenchmen first had to reach James Bay, and this was presenting more difficulties than they had envisioned. When the oxen were sent back to Montreal at the end of the first day, the expedition had travelled only two leagues, about five English miles. And the next day was worse because the ice on the river was so rotten that the men started to break through. When de Troyes realized that the ice would not support the weight of more than a few men on any one spot, he divided his party into small, widely separated groups. Although the men continued to break through the ice from time to time, they finally reached the foot of the Long Sault Rapids, where they saw the first open water. The following day, 5 April, the sleds and dog-teams were sent back to Montreal and preparations were made to fight against the currents of fast-flowing, turbulent water.

The men cut sturdy poles for pushing their way upstream, whittled a supply of spare paddles to replace the ones that would surely be lost and broken in the heavy work ahead, and re-gummed the canoes, checking each seam to make sure that it was watertight. When these tasks were completed, the first string of canoes was launched. All day the men in the canoes fixed their poles in the rocky riverbed while the men on shore strained to pull the craft by their bowlines. From time to time the men were forced to work in water that came up to their waists, and occasionally up to their necks. When the first string of canoes finally reached the top of the rapids, the men had to return for another string. It was hard, bone-chilling work.

Once past the rapids, a day was set aside to repair damaged canoes. De Troyes had learned that his voyageurs followed orders only as a last resort and so he responded by organizing the men into military-style units. For moving the expedition upstream, a system was established whereby the canoes were partially



MAP BY J. LOATES



Lost Channel is one of the few surviving rapids on the Ottawa River.

unloaded at each portage and while the lightened canoes were poled through the fast water, the excess baggage was carried across the portage.

Unlike the manicured portages of today's national parks and well-travelled northern rivers, these portages were usually steep, littered with fallen trees and tumbled rocks, and extremely slippery when wet. And it rained much of the time. De Troyes's systems for organizing and moving the men and equipment in small units worked so well that they arrived at Lake Temiskaming on 19 May. The expedition stopped at a small trading post operated by the Compagnie du Nord, located on an island at the mouth of the Montreal River. De Troyes purchased new smaller and lighter canoes, suitable for travelling the increasingly shallow and narrow rivers ahead.

That year, 30 May was hot, dry, and very windy. De Troyes and his men were crossing a long portage when a forest fire suddenly swept down upon them. The entire party was almost trapped with only one means of escape from the inferno. They threw their gear into the canoes and paddled out to the middle of the river. But the river was a mere thirty feet wide at that point, and de Troyes and his men were threatened with imminent destruction. Covering the canoes and themselves with wet blankets, they huddled in the darkness as the conflagration became more violent, sweeping across the river and setting fire to the opposite shore. But when this fiery episode had ended, a survey revealed that only one canoe, several muskets, and a few sacks of corn had been lost.

The next day, a short portage carried the party across the northern divide which separates the waters flowing to the Atlantic and Arctic oceans. It was two months since the expedition had left Montreal. As de Troyes sat at the foot of the last portage of the day, he recorded his impressions of the country.

Looking northwards on the Abitibi River

As one climbs the rivers on the Canadian side of the watershed, there are rapids, waterfalls, and cascades which are like steps that climb to the height of land. These also act as natural locks, so that it is quite easy to travel between them. But they are also the cause of the numerous portages one makes on this trip. And when one arrives at the height of land, the country is very rocky and dotted with lakes. For fifty leagues on this side of the divide the country is very beautiful. From this watershed, the lakes no longer drain towards Quebec, but discharge themselves into the northern bay, descending there by a series of rapids and cascades such as I have already described.

On Saturday 1 June, the adventurous crew travelled downstream for the first time since leaving Montreal. With the current pushing the canoes along, nine leagues were covered that morning, requiring only two portages, and by early afternoon, camp was set up on Lake Abitibi. From the lake, the expedition advanced with increasing speed down the Abitibi River towards James Bay, although the weather was still bad much of the time; on 13 June, for example, six inches of snow fell.

Four days later, on 17 June, de Troyes happened upon an excellent campsite in a thick grove of spruce and aspen. There he spent a day planning the attack on Moose Factory, the nearest English post. A number of planks and stakes were cut, and four stout ladders and a battering-ram were built as part of the preparations.

Early the next morning, de Troyes moved to an island at the junction of the Abitibi and Moose rivers. So as not to alert the English, he remained there with his party, sending three men ahead to reconnoitre. When they returned the advance party reported that the fort was a rectangular structure consisting of four curtain-walls or palisades, each 130 feet long, connecting four flankers or bastions. Both the curtains and the flankers at the corners were actually tree trunks set deep in the ground and rising to a height of some eighteen feet.

Each of the front bastions, the ones facing the river, was pierced for three cannon, which were all in position. The rear bastions were probably armed as well. A seven- or eight-pounder was the heaviest gun in these batteries. The main gate to the fort was in the middle of the curtain that faced the river. Its door was massive, fully six inches thick, hung on heavy strap hinges and reinforced with spikes and iron bars. In the middle of the fort there was a square redoubt or internal fortress that was three storeys high and built of horizontal logs. It had a flat plank roof protected by a low parapet or wall along each side. Although the parapet was provided with embrasures for sixteen cannon, four on each side, only four guns were actually mounted—three brass two-pounders and one cast-iron eight-pounder. In addition to the redoubt, there were two rectangular buildings made of horizontal logs.

The fort was large, solidly built, and bristling with cannon, but it seemed strangely quiet. There was certainly nothing to suggest that the men in the fort were aware of the Frenchmen's presence for there were not even sentries posted. In fact the fort was just a trading post, located at the mouth of a subarctic river, and manned by fur traders, sailors, blacksmiths, and carpenters. However, there was more to consider than the fort for the scouts also reported that when they first arrived a small ship was anchored in front of the post. Later

the ship had moved a league and a half downstream, where it was last seen riding quietly at anchor.

De Troyes decided to attack at dawn on Friday, 21 June. He left most of his gear and all but two of the canoes in camp, guarded by eleven of the men. He loaded one canoe with picks, shovels, spades, and planks, and the other with the battering-ram. Next he divided the men into three companies, a company of eighteen men to attack the rear of the post, a company of only six men to make a diversionary attack on the right-hand curtain, and the last company of sixty-odd men to mount a frontal attack in order to break down the main gate with the battering-ram. After taking their positions, de Troyes and his men waited for the moment to strike.

The attack went like clockwork. It was over so quickly that the English, who were still in their nightshirts, had not been able to fire a shot. In less than half an hour, the French had captured the post and the seventeen Englishmen who were living there.

The next three days were spent examining the post, questioning the prisoners, and making arrangements for attacking the other two English posts on James Bay; Fort Rupert and Fort Albany. De Troyes was disappointed to find that Moose Factory was very short of food and this weighed heavily on his decision-making. According to the English, Fort Rupert would be much easier to capture than Fort Albany. But Fort Rupert was also much farther away, more difficult to reach, and would probably have even fewer supplies than Moose Factory. Fort Albany, on the other hand, was supposed to be well provisioned, but was defended by a well-armed garrison of thirty men.

There was also the ship, which had sailed from Moose Factory the day before the attack. The English said that it was headed for Fort Rupert with Fort Albany as its ultimate destination. De Troyes realized that if the ship were to arrive at Fort Albany before he did, it could anchor in the river below the fort, making a frontal attack very hazardous, and perhaps impossible. De Troyes also needed the ship to haul the captured cannon from Moose Factory up the coast, for he could not hope to take Fort Albany without them. It was decided, therefore, to attack Fort Rupert next. With luck he could capture the ship at the same time.

Taking sixty of the best men with him, de Troyes left Moose Factory on Tuesday, 25 June. Because of drifting ice and bad weather, it took him a week to travel the approximately one hundred and twenty miles to Fort Rupert. The party finally camped by the mouth of a small creek, about four miles from the fort. Once again, scouts provided a full description of the structures, their layout, and the artillery, and noted that the ship was anchored offshore in front of the fort.

Just before dawn of 3 July, de Troyes led his men silently up the shore to the front of the fort. There they waited for the first light of day. At that time of year daylight comes very early to the high northern latitudes; the English were

LORNE FLEECE

Students from the Ecole Secondaire Cochrane use a facsimile canoe and gear to re-enact the de Troyes expedition on the Mattawa River, 8 May 1982.

PAINTING BY MARIANNE COLLINS

Above: Reconstruction painting of Fort Albany as it would have appeared in 1686

Below: This is presumably the plant that de Troyes referred to as Macedonian parsley. De Troyes and his men ate it out of necessity, not by choice.

sound asleep when two canoes, carrying fourteen Frenchmen, paddled out towards the anchored vessel. When de Troyes saw his men boarding the ship, he led the attack against the fort with the remaining men. His timing was perfect. The "naval arm" was swarming on to the deck of the ship as de Troyes entered the fort. Taken completely by surprise, the English were overwhelmed.

De Troyes rounded up thirty prisoners, including Hugh Vernor, the governor at Fort Rupert, John Bridgar, the governor at Moose Factory, and John Outlaw, the captain of the captured ship, the *Craven*. De Troyes herded his prisoners aboard an old hulk that was beached nearby and then ransacked the post. He loaded everything useful, including five cast-iron cannon, aboard the *Craven*. On Tuesday, 9 July, the de Troyes expedition set out for Moose Factory. A few men, including Captain Outlaw, were assigned to sail the *Craven*; de Troyes and the rest were travelling by canoe.

That canoe trip turned into a nightmare. After a long battle with high winds and short, choppy waves, the canoes became separated in a thick fog. De Troyes fired his musket from time to time to see if any of the other canoes were near him, but received no answer. Except for the wind and the fog, he and his paddlers were alone. When the fog lifted, de Troyes found himself near the bottom of a deep bay. He continued westward until nightfall, then paddled ashore to camp in what looked like a pleasant meadow. The meadow was actually a tidal flat that extended several miles inland. De Troyes and his paddlers had no choice but to make piles of driftwood on which they could perch for the night. Because the tides swept over the flats twice each day, there was no drinking water available. They also were reduced to eating a plant that they called Macedonian parsley (probably Scotch lavage) because there was so little food. After spending eight days travelling from one soggy camp to another, de Troyes

and his half-starved men were reunited with the rest of the expedition, including the *Craven* and her crew, in Moose Factory.

Even though they had just captured two English trading-posts, the de Troyes expedition was still desperately hungry. But they now had enough cannon to attack Fort Albany with a reasonable chance of success. The captured guns were loaded aboard the *Craven*, and the flotilla of canoes, led by the ship, sailed north towards the final objective. When they arrived at the mouth of the Albany River, a small scouting party was dispatched. After they reported back on the location of the fort, de Troyes decided to examine the site himself. He landed at the downstream end of what is now Anderson Island, then walked through the bush until he was opposite the fort.

Standing at the edge of the trees and gazing across the river, de Troyes could see the north wall of the structure quite clearly, as it was no more than five hundred feet away. The fort was a squat, heavy structure, well-armed with cannon. The element of surprise that had proved so successful for the Frenchmen at Moose Factory and Fort Rupert could not be depended upon at Fort Albany. De Troyes's men constructed a platform for their cannon in front of the fort as they readied themselves for a major conflict.

De Troyes sent an envoy to meet Henry Sergeant, the governor of the post, to ascertain whether the English would consider surrendering without a fight. When Sergeant refused, de Troyes and his men unloaded eight cannon from the *Craven*, and hauled them through the bush to the platform. The cannon were mounted and prepared for action. On the morning of Friday 26 July, the chaplain, Father Silvie, said mass. The soldiers then repaired to their waiting battery of guns and opened fire. In less than an hour they fired 140 cannon-balls into the fort; the English guns, however, did not return their fire. Instead a few men appeared outside the fort waving a white flag. De Troyes ceased fire and watched silently as the Englishmen rowed across to the island.

The site of old Fort Albany today, as viewed from Anderson Island

As they drew nearer, de Troyes could see that the boat contained five men, including a drummer. Upon reaching the island, the only one to step out of the boat was the Reverend Mr French, the English chaplain sent to arrange a parley. De Troyes agreed to meet Governor Sergeant in the middle of the river half an hour later. After much posturing and bombast, suitable terms of surrender were agreed to and signed. The battle for James Bay was over. It was now a French possession.

De Troyes's success in the bay was in many respects a disquieting victory. He could not hope to defend his position if a ship were to arrive from England with more men and supplies. His men were exhausted and half starved, for Albany, too, was almost out of food. The only way to feed his men was to lead most of them back to Canada as soon as possible. Before heading south, he paused only to raze the fortifications at Fort Albany and to load the cannon back aboard the *Craven*.

Leaving forty-two men behind on the bay, de Troyes headed upstream from Moose Factory with the others on Monday, 19 August. Five or six pounds of pork and some malted barley was all the food that remained for the return journey although they were able to pick up a few provisions that had been cached at Lake Abitibi. They continued south, taking five days to reach Lake Temiskaming. By this time, de Troyes's sole concern was returning to Montreal. His journal was almost completely neglected now, for what could he possibly say that would not be anticlimactic? The heroic deeds were over; the battle was finished.

The arrival of de Troyes and his party at Temiskaming was marked by a resounding volley of shot and, alas, a very poor supper, for once again supplies were low. The last detail that de Troyes entered in his journal was about their departure from Temiskaming on Sunday, 8 September. He had lost only three men during the entire operation, and when he arrived back in Montreal de Troyes was exhausted but triumphant.

Dr Walter A. Kenyon is a retired curator of archaeology. For twenty-five years he worked at the ROM conducting research on historic and prehistoric problems, mainly in Ontario and the eastern Arctic. He is currently writing a book on the history of Arctic exploration in Canada.

HELEN HOGG

Stars in her Eyes

"I've spent sixty years working in this field and I'm not through yet."

Judith Knelman

ASTRONOMER Helen Sawyer Hogg remembers being allowed to go out after dark one spring evening in 1910 to see Halley's Comet. "I don't remember much about the experience," she says, "but I can still visualize the thing with its lovely tail."

She was five then, growing up in Lowell, Massachusetts, in a family drawn to nature. Her father, a banker, and her mother and aunt, former schoolteachers, encouraged her to observe and learn about wildflowers and ferns and leaves and rocks and stars. Which she did, receiving a Ph.D. in astronomy from Radcliffe in 1931 for her work at the Harvard College Observatory. And so when she sees Comet Halley again in 1986 she'll be able to absorb a little more from the experience. She says in an article in the *Queen's Quarterly* (written with her son David, also an astronomer): "Its period of around seventy-six years has permitted a large proportion of the earth's inhabitants to see it once. A favoured few see it twice."

Though Hogg, who taught at the University of Toronto for thirty-one years and has been doing research at the David Dunlap Observatory since 1936, turned eighty last year, she shows no signs of wanting to retire to a rocking chair on the front porch to watch the world go by. Her job is to watch the *universe* go by. "I've spent sixty years working in this field, and I'm not through yet," she says.

An internationally recognized authority on variable stars in globular star clusters, Hogg observes changes in the size, temperature, and brightness of hundreds of stars in globular clusters in order to be able to estimate, among other things, their age and their distance from the sun. This adds to the information we have on our galaxy, the Milky Way, which contains about 100 000 000 000 stars, one of which is our sun, and is just one of millions of galaxies in the universe.

About one hundred and thirty globular clusters outline the Milky Way. (Galaxies more massive than our own have more clusters—perhaps as many as ten thousand.) Each cluster contains tens of thousands to hundreds of thousands of stars moving in slow and beautiful symmetry around a common centre of gravity as the cluster itself orbits around the centre of the galaxy. The orbits take millions of years to complete. Clusters were the first stellar formations: with ages of sixteen to eighteen billion years, they are close to the age of the universe.

So information about the way in which stars—globes of glowing gas—pulsate as their nuclear-generated energy pours out is extremely useful. It takes years to accumulate, though. A star's cycle from bright to faint to bright again takes anywhere from days to hundreds of days. Clusters are only observable during our summer months, and if someone else needs the telescope, or clouds come up, or the sun gets between the earth and the cluster, the observer may have to wait a year for another chance to document the cycle further.

Hogg has not only taken about two thousand photographs of clusters at various points in their stars' life cycles but has also published her findings in numerous scientific papers. As the authority on the subject, she has combined her findings with the discoveries of other astronomers working in the same field of research in a series of catalogues—the only such compilations that have ever been published. Her first catalogue was published in 1939, and she is now working on the fourth up-to-date version.

That is how scholarship works in astronomy. When you deal in billions of years and in distances of tens of thousands of lights years, sixty years of observing does not seem a great deal. "I don't think I've made that many earth-shaking discoveries," says Hogg self-deprecatingly. "It's just a case of working along and accumulating a lot of information in one area."

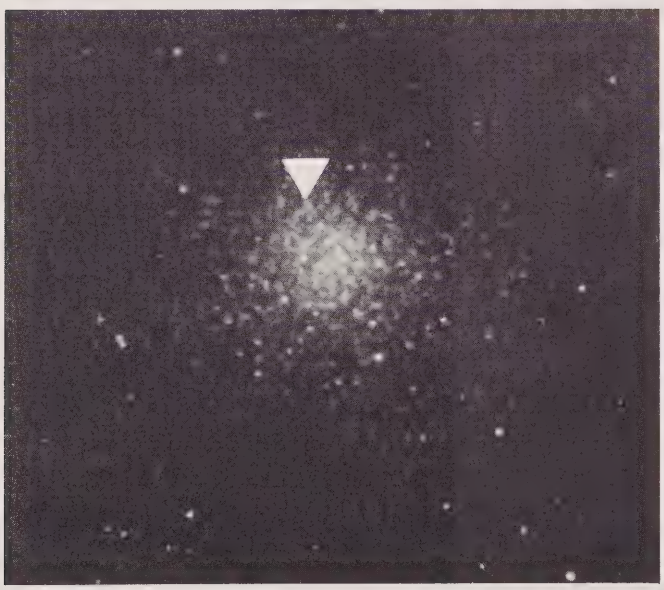
Hogg is still doing bibliographical work and working with the glass negatives produced by other observer-photographers, but several years ago she gave up

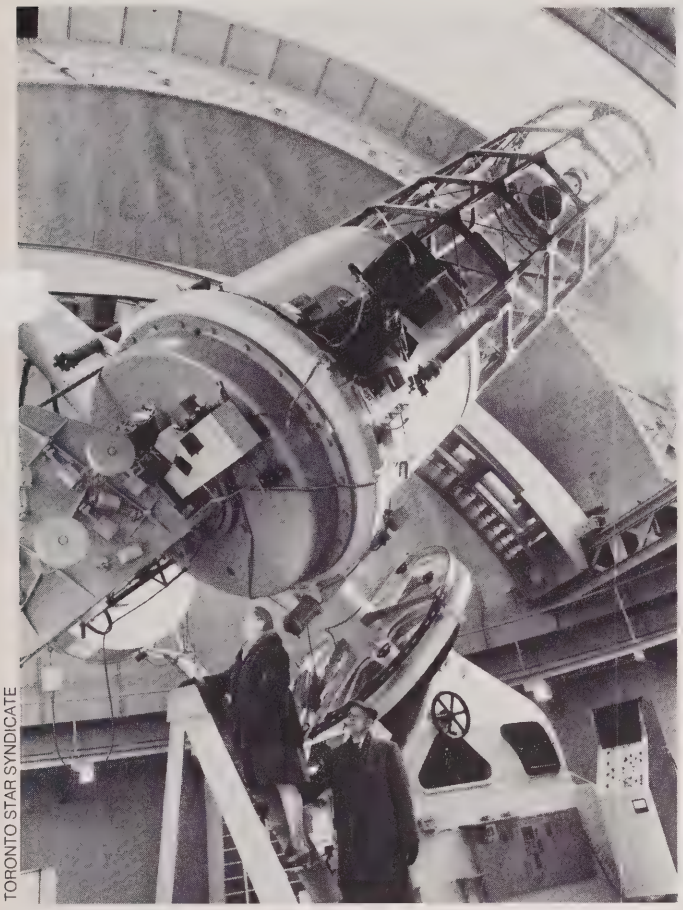
Opposite page: Helen Hogg standing at the top of the dome of the David Dunlap Observatory

Right: Photograph of Omega Centauri taken by Dr Nolan Walborn using a University of Toronto 24-inch reflecting telescope at Las Campanas, Chile. This globular star cluster is located 17 000 light years away from earth. The photograph was taken with a twenty minute exposure during the night of 9–10 February 1972.

PHOTOGRAPHS DAVID DUNLAP OBSERVATORY

Below: These photographs show a cepheid, a bright variable star, located in Messier 14, a globular star cluster. The star cluster was discovered by Messier two centuries ago, but Helen Hogg discovered this cepheid. The brightness of this star changes over a period of eighteen days in which it progresses in appearance from its most faint to its brightest and then back to faint. In the left photograph, the cepheid is barely visible, but in the right photograph, it is very bright.





TORONTO STAR SYNDICATE

CANADIAN GOVERNMENT PHOTO CENTRE

personal observing. Staying up all night and moving the huge telescope around was just too strenuous. "I find I don't have the physical strength I used to. I read of go-getters like Bob Hope, who's eighty-three, and marvel at them. I haven't that kind of energy. But I'm still working every day."

Helen Hogg's first job was as a teacher at Mount Holyoke College, where she had done her undergraduate studies. In 1931 she gave that up to accompany her Ontario-born husband, Frank, also an astronomer, to Victoria, where he had a job as a researcher with the Dominion Astrophysical Observatory. Rumour had it that Cecilia Payne, now regarded as the foremost woman astronomer of all time, had been turned down for the job because it would not have been proper for a woman to spend nights in the dome with male technicians.

There was no question in the depression years of a wife's being employed at a government service where her husband worked, but Helen Hogg didn't mind being unemployed as long as she had access to the telescope at Victoria, which was the second-largest in the world at the time. As long as her husband was willing to chaperon her, she was allowed to do her observing. So by virtue of being a married woman, she was able to use the telescope to which Cecilia Payne had been denied access. Far from being held back in her career by her marriage, she was actually advancing beyond the boundaries established for unmarried female astronomers.

The first year, Helen Hogg spent many a winter night keeping Frank company as he worked on his programs of observation. That summer she had a baby daughter and took her up in the dome in her basket on several occasions so that she could be fed on time. Helen Hogg was not held back by motherhood. She was going places, even though she wasn't being paid. Indeed, she was establishing a scientific reputation every bit as impressive as her husband's.

In 1935 Frank Hogg took a position as a lecturer and researcher at the new David Dunlap Observatory of the University of Toronto, whose telescope bumped the one in Victoria to third place. The second year the Hoggs were in

Above left: Helen Hogg is standing near the Cassegrain focus, the focus most often used for the telescope of the David Dunlap Observatory. With her is Gerald Longworth, who joined the observatory staff in 1935 and who remained on staff until shortly before his death in 1985.

Above right: Helen Hogg standing near the Newtonian focus located at the top of the telescope at the David Dunlap Observatory. This is where most photographs of star clusters are shot.

COURTESY H. HOGG

Helen Hogg being greeted by former Governor General Jules Leger and Madame Leger before the reception for new Companions of the Order of Canada. Helen Hogg is accompanied by her daughter Sally MacDonald.

Toronto, J. S. Plaskett, director of the Dominion Astrophysical Observatory in Victoria, managed to get Helen a research grant from the National Academy of Sciences of two hundred dollars, which bought her the services of a maid for a year. "If I had it to do over again in present times of household help I don't know how I'd manage," she says. "I'm not sure I could take children to day-care centres. I was brought up to think that that home is where the child is unless it is in school."

From 1936 on Helen Hogg was working virtually full-time. In 1941 her responsibilities increased as male astronomers went to war, and she became a lecturer as well as a researcher. Most of her teaching was directed at the general student who wanted to know something about astronomy but wasn't anxious to take more than one course in it.

Frank Hogg died on 1 January 1951, five years to the day after he became director of the observatory. "It was a difficult time then. He was taken very suddenly, and then when somebody who's director and head of the department goes, it leaves a void. I myself was teaching and I had the children, so it was a heavy time." Helen went on with her research and took on a column on astronomy for the layman that her husband had been writing for the Toronto *Star*. Her column, which ran for thirty years, led to a book on popular astronomy, *The Stars Belong to Everyone: How to Enjoy Astronomy* (Doubleday, 1976).

In 1950 Helen Hogg was awarded the Annie J. Cannon prize of the American Astronomical Society, an international award given once in three years to a woman astronomer for her research. Since then, Hogg has continued to be the recipient of an overwhelming number of major awards and honours. Among these are Companion of the Order of Canada (1976), the naming of a minor planet Sawyer Hogg by the International Astronomical Union (1984), and a special session held in honour of "Canada's most distinguished and beloved astronomer" at a joint meeting in Toronto of the American Association of Physics Teachers and the American Physical Society (1985).

The University of Toronto made her a full professor in 1957 and upon retirement in 1976 she was named Professor Emeritus.

"It's one of those strange things that all these things are happening now," said the seasoned observer of strange things. But a colleague, Donald MacRae, director of the David Dunlap Observatory and chairman of the Department of Astronomy, University of Toronto, from 1966 to 1978, offered a more logical explanation: "She's sort of a first lady of science. When people think of women who have succeeded in their scientific careers, they naturally think of Helen Hogg." ❦

As a staff writer for the Department of Communications, University of Toronto, Judith Knelman is a regular contributor to The Graduate.

The preceding article was adapted, with permission, from The Graduate, *the University of Toronto alumni magazine, September/October 1985.*

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High Fidelity Magazine

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Insect Life at Night

Have you ever wondered why fireflies, moths, and many other insects are so active at night, while most other creatures are fast asleep? Surely it is unpleasant for them to be up and about when the cool of the night chills their small bodies, making it difficult for them to move. Furthermore, one may suppose that like us, they have difficulty seeing in the dark.

There are two good reasons for the nocturnal behaviour of these insects. At night, fewer insect-eaters are out hunting, and there are fewer other insects searching for food so it is easier to find. In very hot climates, there is another good reason for night activity. Insects and many other creatures must stay sheltered from the heat during the day, and they only come out at night when the temperature is more comfortable.

During the day, nocturnal insects remain very still in order to hide and to rest. Katydids and walking sticks are two examples of insects whose shape and colouring serve as daytime camouflage.

Nocturnal insects attract mates in special ways. Female moths release a chemical called a pheromone, which has an odour that is attractive only to male moths. Some male moths fly for miles just to find the female. Male crickets make their familiar chirping noise as if to shout to the females, "Hey I'm over here."

PHOTOGRAPHS COURTESY DEPT. OF ENTOMOLOGY, ROM

Above: The shape and colouring of this walking stick blend with the surroundings, making the insect very difficult to detect during the day.

Below: Fireflies use bioluminescence to signal their presence to each other.

FOR THE YOUNGER READER

Other insects, like fireflies, depend upon bioluminescence, a natural means of emitting light. Female and male fireflies flash light signals to each other and each species has a different rhythm of flashes. The light is produced by the reaction of chemicals inside the body of the insect. The most unusual characteristic of this light is that it is cool, unlike most light. The insect does not burn itself as it would if it produced the same kind of light that one finds in a light bulb, for example. The reaction of a chemical, the enzyme luciferase, is responsible for keeping the light cool. The enzyme is named after Lucifer who also had a less sinister role as the bearer of light.

There are South American beetle larvae that also depend upon bioluminescence. Walking around, they look like a gathering of toy trains with little headlights and many other lights extending down their sides. It is not surprising that these insects are often referred to as "railroad worms". We do not know how they use their lights, but we do know that the lights are not used for seeing. Like most nocturnal insects they have eyes which are especially constructed for seeing in the dark.

In parts of the world where the patterns of daylight and darkness vary radically from season to season, there are some nocturnal insects who have found ways to adapt. In northern regions such as the Canadian Arctic where there are months of constant daylight, some nocturnal insects have adapted to daytime activity. The development time of other insects has changed so that they become able to fly when periods of darkness recommence to create a pattern of light and dark hours. All the moths die when the cold and constantly dark months of winter descend.

Even though active days and restful nights form the most satisfactory living pattern for us and most other animals, nocturnal insects are a reminder that, for many creatures, active nights and restful days are a preferable way to live.

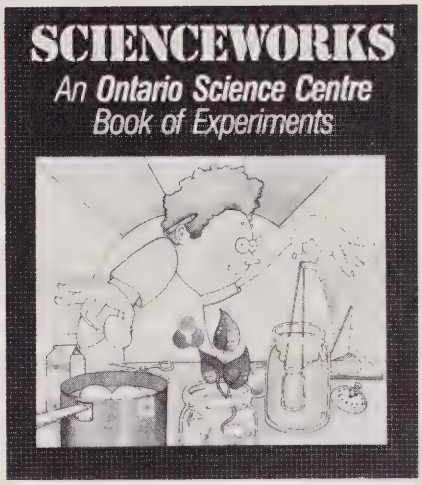
REIN JAAGUMAGI

A Breed Apart
Tony German
McClelland and Stewart
272 pp. $3.95 (paper)

Sixteen-year-old Duncan Cameron is the son of a "bourgeois"—North-West Company trading partner Angus Cameron—and his "country wife", the Cree Rose Flower. Although the mixture of white and native blood was common during the opening up of the Canadian northwest in the early 19th century, life was not always easy for the country families of the European fur traders.

Duncan fights for his status at school in Montreal, and then must overcome the vicious taunts and plottings of Hudson's Bayman Harry Whistler who tries to burn and murder the Northwest Company into submission.

Tony German's best novel for young people has a sweep and colour which is bound to lift history off the page for many young readers.
Recommended for Grades Seven and up



Scienceworks
Ontario Science Centre
Illustrated by Tina Holdcroft
Kids Can Press
86 pp. $16.95 (cloth)
$9.95 (paper)

Do you want to make rain? Would you like to see around corners? How much weight can be supported by an eggshell? Would you like to learn a never-fail way to remove lids from glass jars?

It doesn't take long to become completely engrossed in this goldmine of amusing and instructive science experiments put together by the Ontario Science Centre. All the experiments can be accomplished with the use of items easily available in any household, and all of them are guaranteed to entertain and enlighten children of many ages. The book is made particularly attractive by the lively artwork of Tina Holdcroft.
Recommended for Grades Three and up

Reviews reprinted from The Children's Book News *courtesy of The Children's Book Centre, Toronto.*

Calling Young Writers

Children between the ages of 9 and 14 years, who wish to submit short articles or poems about an experience at the Museum, may send their articles to Rotunda, *Publication Services, Royal Ontario Museum, 100 Queen's Park, Toronto, Ontario, M5S 2C6. No article will be returned unless it is accompanied by a stamped, self-addressed envelope.*

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For further information and brochures, write Mrs. Elsa McKay, ROM, 100 Queen's Park, Toronto, Ontario M5S 2C6 or call Mrs. McKay at 586-5513

COURTESY DEPT. OF INVERTEBRATE ZOOLOGY, ROM

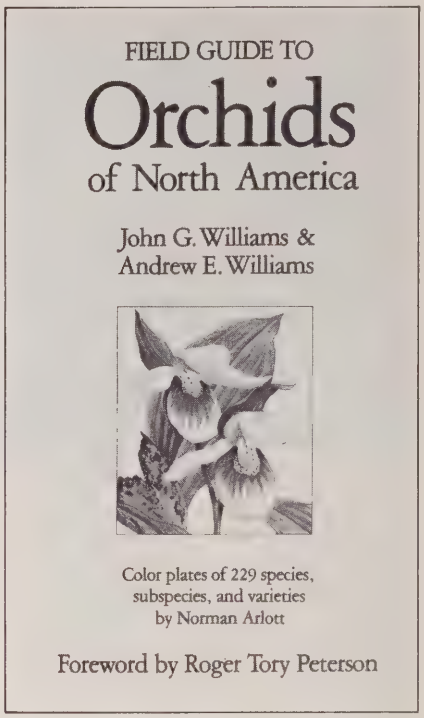
Above left: Shell of a common spirula *(Spirula spirula)*. The common spirula is a species of small deep-sea squid that is found in warm waters around the world. The shells are often washed ashore onto tropical beaches.

Above right: Shell of a Japanese wonder snail *(Thatcheria mirabilis)*. This species of snail is found in deep waters of the western Pacific Ocean.

▶ Shell specimens from two valuable private collections, recently donated to the ROM, will greatly enhance the quality and variety of the Museum's modest holdings of mollusc shells. The shells will be used for education, reference, and a new gallery display that is scheduled for completion in 1989.

Approximately 5000 specimens of gastropods and bivalves, mainly from Florida and the West Indies, were donated by Mr Ralph Presgrave. Some 300 colour slides of molluscs also were received as part of the Presgrave collection. A collection of approximately 2000 shells from Florida were presented to the Museum by the family of the late Mrs Myrtle Powell. The Department of Invertebrate Zoology is especially grateful for these donations.

DALE R. CALDER



Field Guide to Orchids of North America
John G. Williams and Andrew E. Williams
Foreword by Roger Tory Peterson
Universe Books, New York
143 pp. $16.25 (paper)

Reviewed by James E. Cruise, former director of the ROM

No group of plants is more intriguing to the nature lover than the orchid. The bizarre shapes and great range of colours of the flowers and the curious adaptations of many orchid species command the attention of all students of evolution. Charles Darwin was so fascinated by the complex and specialized adaptations of orchid flowers for pollination that in 1862 he published the book *The Various Contrivances by which Orchids are Fertilized by Insects*, a work still admired for its accurate reporting of nature's phenomena.

There are 177 different species of orchids which grow in the region from Alaska, Greenland, and the Arctic south to the Mexican border. *Field Guide to Orchids of North America*, a pocket-size, soft-cover book, is the first comprehensive

field guide on this subject. The authors, naturalists John G. Williams and his son Andrew, make it possible for the reader to identify growing plants without having to pick or dig any specimens.

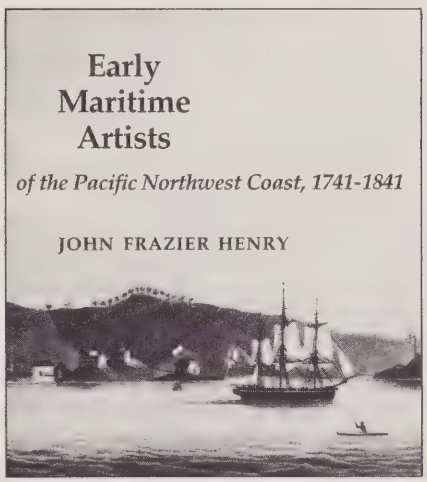
The plant family called Orchidaceae is usually considered to be the second largest, with between fifteen and thirty-five thousand species. It also contains the most highly evolved plants. The orchid flower is easily distinguished from all other flowers because of its asymmetrical appearance. Of the three petals that form the flower, the central petal, known as the lip or labellum, is often noticeably larger than the other two petals, as well as being differently structured and more brightly coloured. Orchids are also unique because they possess a *column*, a thickened structure combining the male and female reproductive organs, which projects from the centre of the orchid.

One orchid plant may scatter as many as two to three million seeds, so minute in size as to be like dust in the wind. In order to become established, a microscopic orchid seedling must form a symbiotic relationship with one or more species of fungus in and around its roots, thus enabling the seedling to obtain nutrients from decaying organic matter in the soil.

The slow and unpredictable nature of reproduction in orchids increases their vulnerability. One of our terrestrial orchid seedlings may remain for several years as a colourless underground protoplant. Even after emerging into the light and beginning to carry on the process of photosynthesis, the young orchid plant may require an additional eight to ten growing seasons before it flowers and begins to produce its crops of seeds.

In the *Field Guide to Orchids of North America*, every orchid species is described, and its popular and scientific names, distribution, habitat, and flowering period are documented. In addition, there are entries and illustrations for the generally recognized subspecies and varieties. The descriptions are detailed yet easy to follow in the field. The 229 full-colour illustrations by the young British artist, Norman Arlott, are outstanding and are organized to make comparisons easy.

John Williams has provided six original dichotomous keys to facilitate the field identification of orchid species, a glossary of botanical terms, and a checklist. No field equipment other than a hand lens is needed. This small book will make orchid hunting and orchid identification a joy for many North Americans.



Early Maritime Artists of the Pacific Northwest Coast, 1741–1841
John Frazier Henry
Douglas & McIntyre
240 pp. $40.00 (cloth)

Reviewed by art historian and freelance writer Geoffrey Simmins

What attracted the first Europeans to the Pacific northwest coast? For many it was the lure of instant wealth, attained by trading sea otter pelts to the wealthy Chinese. For some such as the unlucky Dane Vitus Bering, the first European to reach the coast, the motivating force was primarily scientific discovery.

Bering reached the coast in 1741 and claimed it for the Russian court. By the time of his arrival, however, he was worn out, dogged by poor weather and beset by a fractious crew; he died before returning home. Others were more fortunate. During the next century, hundreds of traders and scientists of Russian, Spanish, French, English, and American origins ventured to the Pacific northwest coast. Many of them looked around and drew what they saw. This book makes sense of the vast congeries of images that they left behind.

It took amateur historian and former banker John Henry nearly twenty years to locate and to analyze the many drawings. His book justifies the long gestation period. In fact everything about *Early Maritime Artists of the Pacific Northwest Coast, 1741–1841* reveals the fruits of long and careful research. Many of the drawings, for instance, are reproduced from obscure foreign repositories.

The book's presentation matches the thoroughness of the research. It is well designed and attractive with excellent colour reproduction. The text is lucid, authoritative, compelling, and written with wit and verve. A lengthy bibliography and an appendix listing major repositories of the drawings are also included.

Henry describes fully some of the principal voyages made by each country and within each national group he singles out individual artists for more detailed discussion. His selections range geographically from Alaska to the Oregon-California border. (He draws no distinction between Canadian and American subjects and there is little attempt to distinguish the different Indian tribes.)

The presence of official artists was scarcely fortuitous on many of the trips. Such artists frequently were issued detailed instructions to draw native people, significant topographical features, flora and fauna, and anything else that could be of interest to scientists, soldiers, and politicians back home. Such draw-

ings then provided the sources for the engravings in travel books for which there was an apparently insatiable market. However, Henry also includes the informal work of untrained artists. For instance there are drawings which he found in cabin boys' journals and naval officers' log books. The resulting mix of trained and untrained artistic responses to the coast suggests that the urge to record one's surroundings is persistent, perhaps universal.

There are probably no great artists to be discovered here. John Webber, Captain James Cook's official artist, is the artist most people think of when early depictions of the northwest coast are mentioned. Although Henry has taken pains to include lesser-known artists' work, even a single rough sketch by Webber confirms his pre-eminence as the most gifted artist who worked on the coast.

Some drawings by lesser lights do possess unexpected power and beauty. One, by Russian botanist and artist Aleksandr Filippovich Postels, shows Russian soldiers gathering sea-kelp. Titled *Algarum Vegetatio* and dated 1827, the drawing is of almost hypnotic and certainly non-naturalistic clarity. And Spanish artist Tomás de Suría emerges as an artist with an unaffected eye for the depiction of the faces and the gestures of the native peoples. Other artists range from the untalented to the mendacious who apparently drew what their audiences wanted to see.

This latter trait is also, of course, characteristic of the art of European artists active in eastern Canada during the 18th and early 19th centuries—the frilly European topiary; views of natives posed as carefully as statuary or in gratuitously erotic or brutal postures—but Henry's book helps us to realize that European artists' sensibilities almost inevitably coloured their perceptions of what they depicted. Only great or banal artists, it seems, could escape catering unconsciously to an audience thousands of miles distant.

Henry includes several original drawings for comparison with pub-

lished engravings executed after them. The engravings reveal a fascinating process of transformation. In some cases the changes seem to have been undertaken for formal reasons—enlarging a view of an island, peopling an empty lagoon with an imaginary procession of native boats. Presumably such compositional changes would have made the drawings more interesting for the reader. Some engravers either misunderstood or chose to reinterpret the drawings, with occasionally ludicrous results. One engraving shows an incongruous cluster of palm trees and other tropical vegetation, entirely absent in the drawing.

The single most striking and yet subtle example of a transformation between an original drawing and an engraving executed after it is seen in the work of French artist Gaspard Duché de Vancy. In a drawing of *Native Costumes at Port des Français*, dated 1786, de Vancy disposes his figures in a neo-classical frieze that owes more to David than to natural observation. The engraving is a faithful copy of the drawing's composition but the mood is altered by changing the facial features from amusement to incongruous fear. A standing observer, already conventionally European in the drawing, in the engraving becomes a statuesque Greek athlete holding a discus.

By inviting such comparisons of closely-related images, and simply for charting new waters by indicating the wide range of drawings that are available, Henry's book should help us to reassess our perception of the way European artists viewed the coast. The book also invites larger questions. Where do these drawings actually belong, in the domain of anthropologists or art historians? Can we even draw a meaningful distinction here? I think we cannot. Since these drawings are the first visual response of Europeans to a distinctive part of this continent they deserve a place in our artistic record; perhaps even in survey courses of Canadian and American art history.

Explorations in Canadian Folklore
Edited by Edith Fowke and Carole H. Carpenter
McClelland and Stewart
400 pp. $14.95 (paper)

Reviewed by Pauline Greenhill, folklorist

As a folklorist, I'm happy that this collection of articles on Canadian folklore has been published, for it brings together diverse and important studies that have not always been readily available. For those who are not folklorists, there is still reason to share my pleasure with this book, for it presents a valuable and interesting series of very readable articles on many aspects of folklore in Canada.

Although one may lament the exclusion of a personal favourite in such a collection, the articles chosen by Fowke and Carpenter present a good variety and a fairly representative sampling of works by established folklore scholars and others who are writing on the subject. The book is divided into four sections covering descriptions of early encounters between European and

American visitors and the native peoples, personal accounts of life in the different ethnic and regional cultures of Canada, and surveys and analyses of various general topics relating to Canadian folklore.

The editors have chosen the works of writers who do not use technical language or special jargon to express their theories, therefore the last two sections of the book will have as much appeal as the first two sections for the general public.

No one who has ever attempted to understand the Canadian obsession with Newfie jokes should overlook the article "The Ethnic Joke in Canada" by Robert Klymasz. And anyone who has seen more in folktales than mere entertainment will be fascinated by Barbara Kirshenblatt-Gimblett's article "A Parable in Context". These articles are as captivating as Emily Carr's personal mythic statement "D'Sonoqua" (one of the highlights of the book) or Paul Kane's account "The Buffalo Hunt", which are included in the earlier sections of the book. My only quibble with this volume is that it ignores the extensive exploration in Canadian folklore that is currently being conducted. Fowke and Carpenter would have done well to commission new works from younger scholars, actively engaged in field research.

To the folklorist, the first two sections of the book possibly contain the most new and valuable material. To non-specialists, the book introduces the world of Canadian folklore scholarship. Here they will meet collectors like Helen Creighton and W. Roy Mackenzie who pioneered folksong fieldwork in Canada. They will be introduced to material that they may not have considered as folkloric such as John D. A. Widdowson's "The Function of Threats in Newfoundland Folklore". They will encounter well-known legendary figures like Paul Bunyan, and lesser-known figures like the man who plucked the gorbey. And throughout the text they will find folklore playing a significant role in the cultural expression of Canadians. ❦

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